DISSERTATION ON

ANAL SPHINCTER COMPLEX
A COMPARATIVE STUDY OF VAGINAL DELIVERY WITH EPISIOTOMY AND WITH PERINEAL LACERATIONS IN PRIMIPAROUS WOMEN - TRANSVAGINAL ULTRASONOGRAPHIC EVALUATION

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CERTIFICATE

This is to certify that the dissertation work titled **"ANAL SPHINCTER COMPLEX - A COMPARATIVE STUDY OF VAGINAL DELIVERY WITH EPISIOTOMY AND WITH PERINEAL LACERATIONS IN PRIMIPAROUS WOMEN -TRANSVAGINAL ULTRASONOGRAPHIC EVALUATION"** is a bonafide research work of DR**.N.BANUREKHA,** Enrolment No…….. Submitted in partial fulfillment of the requirements for the award of Degree of **M.D. OBSTETRICS & GYNAECOLOGY (BRANCH-II)** in **THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY** CHENNAI- 600 032.

Signature of H.O.D **Signature of Dean**

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INTRODUCTION

INTRODUCTION

Episiotomy is a widely performed intervention in childbirth. Episiotomy has traditionally been one of the most frequently performed obstetric procedures and has been one of the more controversial. Defined as a surgical incision in the perineum to enlarge the vaginal opening for birth, episiotomy is the incision of the pudenda, whereas perineotomy is the incision of the perineum.

It is the only surgical procedure in obstetrics to be performed without the patient's specific consent.

History of episiotomy

First description of an episiotomy was given by Sir Fielding Ould (1710-1789) a Dublin midwife in 1742.(1) in his A treatise on Midwifery in three parts

'It sometimes happens…… that the head of the child …cannot however come forward by reason of the extraordinary constriction of the external orifice of the vagina ……wherefore it must be dilated if possible by the fingers… if this cannot be accomplished, there must be an incision made toward the anus with a pair of crooked probe scissors, introducing one blade between the head the vagina,……. as for as shall be thought necessary for the present purpose and the business is done at one pinch by which the whole body will easily come forth.(2)

Our predecessors were accomplished at trying to avoid perineal lacerations.

In 1776 Harrie discussed the importance of lubricating the perineum and vagina with fresh hog's lard, ironing out the perineum, and controlling delivery of the vertex.(3)(38)

Puzos recommended support of the perineum to prevent lacerations. (4) Before the development of suturing, perineal lacerations were managed with prolonged bed rest and sometimes binding the legs tightly together.

Pare is said to have been the first to suture the perineum whereas Mauriceau is credited for the first perineorraphy(5).In 1799, Michelis first recommended midline incisions in the perineum(6). In 1847, Dubois first suggested making an oblique incision in the perineum known today as the mediolateral episiotomy .In 1851; The Stethoscope and Virginia Medical Gazette reported that Taliaferro from Virginia, unaware that the operation had ever been done before, performed the first episiotomy in the United States.(6)(38)

Perineotomy is the incision of the perineum whereas the term episiotomy, coined by Carl Braun in 1857, is the incision of the pudenda, or external genitalia. These terms gradually became synonymous.(7)

Episiotomy was not widely used until the 1920s when Pomery and De Lee changed the climate of opinion regarding the entire birth process. In his, The Prophylactic Forceps Operation, De Lee claimed that episiotomy would preserve the integrity of the pelvic floor and the introitus.(8)

In addition to the strong advocacy for the use of episiotomy by the obstetricians of the day, changes in maternity practices also affected the use of episiotomy. The shift from home birth to hospital deliveries contributed to a shift in the conceptualization of the nature of childbirth. This shift

provided aseptic operating conditions and the necessary technology to carry out episiotomy safely. This change in delivery sites unleashed a cascade of interventions that were not based on scientific evidence. With the increase in the number of hospital deliveries, physicians attending deliveries believed policies of liberal episiotomy use shortened labour, allowing the physician to complete a birth rapidly.

As more women delivered in hospital, increasing numbers of them received anesthesia, which in turn interfered with the natural expulsive efforts of the mothers increasing the need for forceps. Forceps delivery required better access to the birth canal and more room for vaginal manipulations and the dorsal lithotomy position provided just such access.

During the 1970s and 1980s as the naturalist movement flourished, the routine use of episiotomy began to be questioned. Thacker and Banta found that there is no clearly defined evidence for its efficacy, particularly for routine use. and considerable evidence of risks associated with episiotomy, including pain; edema; infection, and, ultimately dyspareunia. (6)

Incidence of episiotomy

Thacker and Banta estimated that episiotomy is performed on 50 to 90 percent of all nulliparas (6).Thorpe et al reported that episiotomy was performed on 62% of vaginal deliveries in the United States. Further breakdown of these numbers indicate that the procedure was executed in 80% of nulliparas patients and in 20% of parous patients (9).

Types of Episiotomy

Multiple techniques can be used to effect an episiotomy. The incision may be made with scissors or a knife, and may be made in the midline (midline episiotomy) or begun in the midline and extended laterally (mediolateral episiotomy). (10)

Midline episiotomy - two fingers are placed in the vagina between the fetal head and the perineum and using straight scissors, the incision is made from fourchette through the perineal body up to but not including the external anal sphincter. Advantages of the midline episiotomy are that it does not cut through the belly of the muscle, the two sides of the incised area are anatomically balanced, making surgical repair easier, blood loss is less than with mediolateral episiotomy. A major drawback is the propensity for extension through the external anal sphincter and in to the rectum. For this reason may practitioners avoid the midline technique.

Mediolateral episiotomy – the incision is made starting at the midline of the posterior fourchette and aimed towards the ischial tuberosity to avoid injury to the anal sphincter. The incision is usually about 4cm long. In addition to the skin and subcutaneous tissues the bulbocavernosus, transverse perineii and puborectalis muscles are cut. Whether the incision is to the right or left depends on operator preference.(1)

ROLE OF EPISIOTOMY IN MODERN OBSTETRICS

The traditional teaching that episiotomy was protective against more severe perineal lacerations has not been substantiated. Thus the liberal use of prophylactic episiotomy is no longer recommended. However, there are still valid reasons for the performance of an episiotomy.

1. To shorten the second stage of labour in cases of fetal distress.

2. In selected cases of assisted vaginal delivery with forceps and less frequently for vacuum assisted delivery.

3. To obtain more room for obstetrical manoeuvres such as those with shoulder dystocia, assisted breech delivery and delivery of second twin and in occiputo posterior.(1)

Consequences of an episiotomy

Immediate consequences of an episiotomy would include blood loss, pain, edema, infection, and hematoma. Definitive disadvantages would include extension to a third degree or fouth degree laceration, the complications of which would include loss of rectal tone, rectovaginal fistula, and abscess formation.(9) (23)More long term complications include the formation of scar tissue, wound infection and dyspareunia.

Routine use of episiotomies has not been shown to improve outcomes for patients and can actually be harmful. Routine or liberal use of episiotomies increases the risk that the patient will have a surgical incision that is larger than if she experiences a spontaneous laceration at birth. (11)

Lacerations of the vagina and perineum are classified as first, second, third or fourth degree. (12)

Classification of perineal injury INJURY	DEFINITION
First degree	Injury confined to vaginal mucosa
Second degree	Injury of vaginal mucosa and perineal muscles, but not the anal sphincter
Third degree	Injury to the perineum involving the anal sphincter complex (external and internal)
3a	<50% of external sphincter thickness is torn
3b	>50% of external sphincter thickness is torn
3c	Internal sphincter is torn
Fourth degree	Injury to anal sphincter complex (external and internal sphincter)and rectal mucosa

One of the major justifications for the use of episiotomy is the suggested protective role of episiotomy in the prevention of severe tears. The use of elective episiotomy is believed to prevent the occurrence of third

and fourth degree perineal lacerations. A comparison of the incidence of third and fourth degree perineal lacerations in patients who did not undergo episiotomy, women who underwent midline episiotomy, and women who underwent mediolateral episiotomy is important. These injuries range from 0% to 2.3% in women with intact perineii,0.2 to 9% in women with a mediolateral episiotomy, to 3% to 24% in women who underwent midline episiotomy.(22)

The association between episiotomy and perineal trauma (third degree laceration) is complex. On one hand mediolateral episiotomy is associated with a lower risk of anal sphincter rupture at delivery. (13)(14)On the other hand it has also been shown that the number of mediolateral episiotomies may be reduced without an increase in perineal trauma.(15) Then the protective effect of mediolateral episiotomy may be limited to situations in which its use is inevitable, while its routine performance may increase the risk of anal incontinence. It is possible that performing an episiotomy when anal sphincter is not in danger increases the risk of direct scissor injuries to the sphincter (Fritel x et al)(16). Unfortunately we do not know what episiotomy rate offers the balance between benefits and risks for the anal sphincter

It seems reasonable to conclude that episiotomy should not be performed routinely (Eason Feldman 2000).(17) The procedure should be applied selectively for appropriate indications. The final rule is that there is no substitute for surgical judgement and common sense (18).

ANAL INCONTINENCE

Anal incontinence is much more prevalent than once thought. Anal incontinence is an embarrassing condition that is largely underreported. Obstetric anal sphincter injuries are the major etiological factor. Recognition of risk factors may minimize the development of sphincter injuries .Many women do not discuss this problem with anyone because it is socially embarrassing. Anal incontinence affects approximately 10% of women. (19)

Less than 50% of woman with fecal incontinence report the problem to their physician. It can be a devastating problem for women and obstetricians must be careful first to try and avoid a third or fourth degree tear and then to repair it meticulously to give a woman the best opportunity for a good functional repair.

Risk factors for third- and fourth-degree tears have been identified mainly in retrospective studies. Taking an overall risk of 1% of vaginal deliveries, the following factors are associated with an increased risk of a third- and fourth-degree tear. (12)

Major risk factors for obstetric anal sphincter injury **RISK FACTOR**	**ODDS RATIO**
Nulliparity (primigravidity)	3–4
Inherent predisposition:	
Short perineal body	8
Instrumental delivery, overall	3
Forceps-assisted delivery	3–7
Vacuum-assisted delivery	3
Forceps vs vacuum	2.88
Forceps *with* midline episiotomy	25
Prolonged second stage of labor (>1 hour)	1.5–4
Epidural analgesia	1.5–3
Intrapartum infant factors:	
Birthweight over 4 kg	2
Persistent occipitoposterior position	2–3
Episiotomy, mediolateral	1.4
Episiotomy, midline	3–5
Previous anal sphincter tear	4

POSTNATAL ASSESSMENT

Postnatal continence assessment should include direct questioning using a standardized bowel function questionnaire so that a reliable assessment of continence can be done.(19) Continence of flatus, liquid and solid feces should be documented together with inquiry concerning fecal urgency, inability to defer defecation for longer than 5 minutes a socially debilitating symptom. The complaint of urgency incontinence may reflect external anal sphincter dysfunction.

A standardized bowel function questionnaire would include in addition to the above questions, an inquiry assessing the need to wear a pad because of anal symptoms, any extra anal leakage or any leakage of material other than stool. (21).

Digital examination of the anal canal may provide an approximate of the integrity of the sphincter and perineal body but is not otherwise diagnostically reliable.

INVESTIGATIONS FOR ANAL INCONTINENCE

It is important to bear in mind that continence depends on multiple physiologic mechanisms and, therefore, no single diagnostic test yields positive results in all patients.

Endoanal ultrasound has significantly changed the evaluation of fecal incontinence over the last decade. In women with fecal incontinence in whom obstetric injury is suspected, 90% have sonographic evidence of injury to one or both sphincters. The ultrasound images show 2 discrete rings of tissue: The inner hypoechoic ring represents the internal anal sphincter and the outer hyperechoic ring represents the external anal sphincter Disrupted continuity of these rings is consistent with structural damage to the sphincter.

It can serve as a screening tool to detect occult sphincter injury following vaginal delivery, thus identifying women at high risk for future incontinence. Women with transient stool or gas incontinence following vaginal delivery may be candidates for screening endoanal ultrasound for further evaluation.

Transperineal and transvaginal ultrasound are reasonable alternatives which are now advocated for use in centres where the equipment or expertise necessary for endoanal ultrasound are not readily available.

Anorectal manometry can detect functional weakness of sphincters that are anatomically intact by measuring sensation, resting and squeeze pressures. Decreased resting pressure suggests isolated internal anal sphincter injury; decreased squeeze pressure suggests external anal sphincter injury.

Rectal sensory testing is assessed by inflating a balloon in the rectum and recording the smallest volume of rectal distention for first detectable sensation (rectal sensory threshold), sensory urgency, and pain (maximum tolerable volume).

Electromyography of the external anal sphincter and the pelvic floor muscles—traditionally performed using needle electrodes or surface electrodes—is helpful in delineating areas of sphincter injury by mapping the sphincter. However, much of this information is now obtained accurately by endoanal ultrasound, which has replaced needle EMG for most clinicians.

Defecography involves imaging the rectum after filling it with contrast material, and then observing the process, rate, and completeness of rectal evacuation using fluoroscopy. Its usefulness in the evaluation of fecal incontinence is limited to cases of rectal prolapse and for the diagnosis of rectocele and enterocele.

Pudendal nerve testing. This test uses an electrode to measure pudendal nerve conduction time, known as pudendal nerve terminal motor latency (PNTML)—thus allowing further investigation for nerve injury.

- Normal PNTML value is 2.2 milliseconds.
- A value between 2.2 and 2.6 milliseconds indicates probable nerve damage.
- A value of 2.6 milliseconds or greater confirms nerve damage.

Clinical use of PNTML is controversial; it helps diagnose nerve injury, but is currently reserved for investigational purposes.

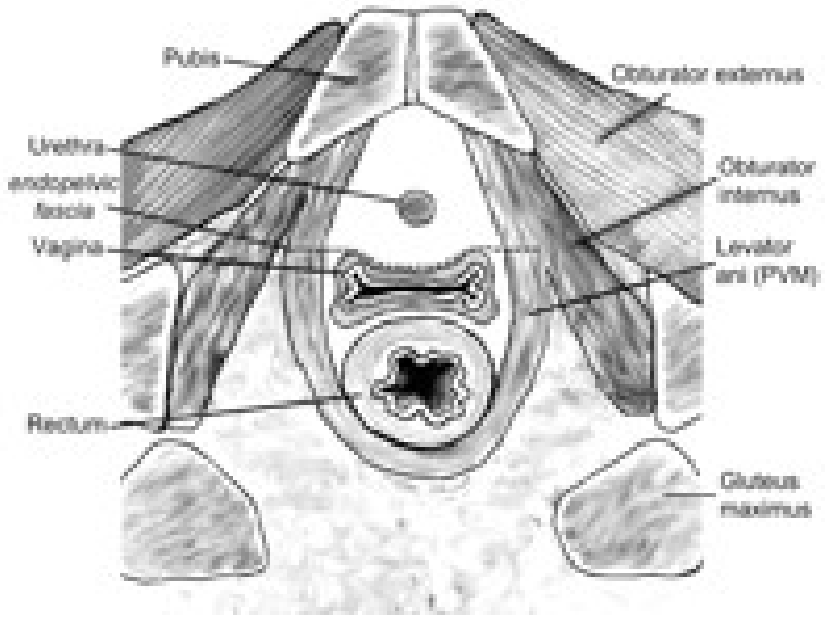
Anatomy of the anal sphincter

The pelvic floor is a multilayer structure consisting of muscles and ligaments that support the pelvic organs and play an important role in pelvic organ function .The major muscle of the pelvic floor is the levator ani, a muscular sheet arising from the pubis anteriorly and the arcus tendineus levator ani and ischial spines on the pelvic sidewalls and inserting into the midline area of the pelvic floor.

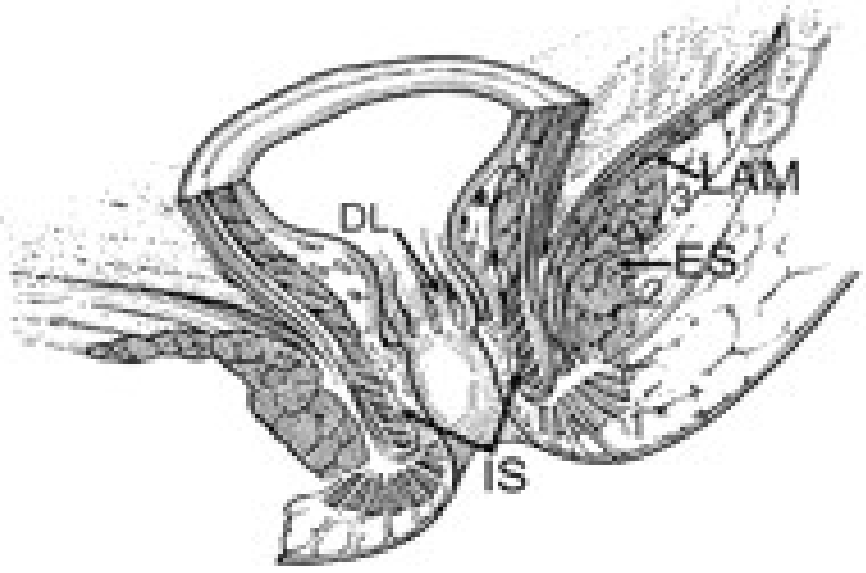
The anal canal is the distal part of the rectum, 3 to 4 cm in length, lying between the anorectal junction proximally and the anal verge distally A dentate line found 1.5 cm from the anal verge demarks the distal squamous (sensory) epithelium and the proximal columnar epithelium. The muscular component or anal sphincter consists of the internal sphincter (IS) and external sphincter (ES).

The internal and external anal sphincter anatomy has been studied in cadavers as it relates to midline obstetric lacerations by Delancey et al .The internal sphincter is a rubbery layer that lies between the external anal sphincter and anal canal. It is a condensation of circular smooth muscle fibers of the rectum .It extends approximately 1 to 1.5cm cephalic to the external sphincter. The internal sphincter is a smooth muscle that provides 75% of the resting anal canal tone.

The External sphincter (ES) is a circular layer of striated muscle fibers. The ES consists of 3 components: the subcutaneous, superficial, and deep portions. The external sphincter increases the anal canal closing pressure in times of increasing need. The puborectalis muscle part of the levator anii muscle, pulls the rectum anteriorly toward the pubic bone, which creates a kinking effect in the rectum and makes the anorectic angle. It thus forms a functional unit with the ES.



Schematic cross-sectional view of the female pelvis (25)



Schematic diagram of the anal sphincter complex. DL indicates dentate line; LAM levator ani muscle; and 1, 2, and 3, subcutaneous, superficial, and deep portions of the ES, respectively. (25)

REVIEW OF LITERATURE

REVIEW OF LITERATURE

In 1993 Sultan et al from London reported on anal sphincter disruption during vaginal delivery. Anal incontinence may be caused by injury of the anal sphincter complex, its innervations, or both. In a prospective study of women before and after delivery using anal endosonography of the internal and external anal sphincter and anorectic neurophysiologic testing to find out the incidence of mechanical and neurologic trauma during childbirth they reported that forty percent of the multiparous women studied demonstrated some evidence of prior sphincter disruption on anal endosonography. Most of these occult injuries were only detected by anal endosonography. They also reported that 35% of nulliparous and 4% of parous women sustained an occult sphincter injury at delivery. The authors concluded that the risk of sphincter damage is greatest during the first vaginal delivery. A posterolateral episiotomy did not appear to protect the patient against the development of sphincter defects. There was a definite relationship between presence of sphincter defects anal pressure and bowel symptoms. (26)

In 1997, Nygaard et al (36) from Iowa city reported in a retrospective cohort study of women who were approximately 30 years postpartum, all of whom sustained an anal sphincter disruption at delivery. They matched the women with a group who had had an episiotomy but with no extension and with a group who had delivered by caesarean section. Bothersome incontinence of flatus was reported in 58.6% of the anal sphincter disruption group,30.3% of the episiotomy with no extension group and 15.2% of the cesarean section group (P=0.001). Bothersome fecal incontinence was reported in 27.6% of the sphincter disruption group, 25.8% of the episiotomy with no extension group, and 15.2% of the cesarean section

group (not statistically signification). Regardless of the type of delivery, anal incontinence occurs in a surprisingly large number of middle aged women.

Carroli G and Belizan J in 1999 conducted a Cochrane review on randomised trials comparing restrictive use of episiotomy with routine use of episiotomy; restrictive use of mediolateral episiotomy versus routine mediolateral episiotomy; restrictive use of midline episiotomy versusroutine midline episiotomy; and use of midline episiotomy versus mediolateral episiotomy. Restrictive episiotomy policies appear to have a number of benefits compared to routine episiotomy policies. There is less posterior perineal trauma, less suturing and fewer complications, no difference for most pain measures and severe vaginal or perineal trauma, but there was an increased risk of anterior perineal trauma with restrictive episiotomy. (27)

Andrews V et al in 2006 conducted a prospective study on the risk factorsfor obstetric anal sphincter injury. The objective of this study was to identify risk factors for sphincter injuries and measure dimensions of mediolateral episiotomies. The authors concluded that mediolateral episiotomy is an independent risk factor for anal sphincter injuries. Although a liberal policy of mediolateral episiotomy does not appear to reduce the risk of such injuries, it may be related to inappropriate technique. A concerted approach to educate trainees in appropriate episiotomy technique and identification of sphincter injuries is imperative to enable reexamination of the true merits or disadvantages of mediolateral episiotomy. (28)

Andrews V et al in 2005 onducted a study investigated potential differences in the cutting of mediolateral episiotomy between doctors and

midwives. Doctors performed episiotomies that were significantly deeper, longer and more obtuse than those by midwives. No midwife and only 13 (22%) doctors performed truly mediolateral episiotomies. It appears that the majority of episiotomies are not truly mediolateral but closer to the midline. More focused training in mediolateral episiotomy technique is required. (29)

In 2000, Signorello et al (30) from Boston reported a retrospective cohort study of midline episiotomies and anal incontinence. They compared patients who had no episiotomy but sustained spontaneous second degree lacerations with patients who had episiotomies and no extensions. A non extended episiotomy tripled the risk of faecal inontinenece at 3 months postpartum compared with a spontaneous second degree laceration an episiotomy may allow the head or shoulder to apply more force closer to the sphincter, which leads to occult disruption.

In 2000 Samuelsson et al evaluated the intrapartum risk factors for anal sphincter disruption and found out that perineal edema,deficient perineal protection during delivery, protracted final phase of the second stage , parity and high infant weight all constitute independent obstetric risk factors for anal sphincter tear. Such information is essential in order to reduce perineal trauma during childbirth. (31)

In 2008, Mous m et al from Netherlands conducted a retrospective case control study in 171 women operated for anal sphincter rupture and 171 age an parity matched controls and found that obstetric anal sphincter rupture is an important risk factor for sexual complaints and for fecal incontinence increasing with age irrespective of menopausal state, for more than 2 decades after delivery. For fecal incontinence, this association is even stronger than 15 years after delivery. (32)

In 2007 Fritel x et al (16) conducted a quasi randomized comparative study on pelvic floor disorders 4 years after first delivery in two hospitals with contrasting policies for episiotomy , one using episiotomy restrictively and the second routinely.

A questionnaire was mailed 4 years after delivery to 774 nulliparous women who delivered of a singleton cephalic fetus at term to measure outcomes such as urinary incontinence, anal incontinence, perineal pain and pain during intercourse.

Of the 627 responses received, 320 were from women delivered under restrictive policy and 307 from women delivered under routine policy.

The trivariate comparison between the two institutions showed no differences of urinary disorders, perineal pain and pain during intercourse Flatus incontinence, on the other hand, was more frequent in women who gave with at the maternity ward with a routine episiotomy policy,. In multivariate analyses the episiotomy policy did not affect the risk of urinary incontinence four years after the first delivery on the other hand a routine episiotomy policy nearly doubled the risk of anal incontinence. So they concluded that there were no benefits to routine mediolateral episiotomy during first deliveries.

In 2008, Rodriguez et al from Colombia performed a prospective randomized clinical trial to compare selective vs routine midline episiotomy for the prevention of third or fourth degree lacerations in nulliparous woman. They found that routine episiotomy was associated with twice as

many severe perineal lacerations as selective episiotomy. This difference cannot be attributed to variables such as fetal weight, gestational age or head circumference, given the similarity between our 2 study groups most of the third and fourth degree tears in the selective episiotomy group occurred in women who had undergone episiotomy.(33)

The West Berkshire perineal management trial focused on the late consequences of mediolateral episiotomy. It found no differences in urinary incontinence, perineal pain or dyspareunia 3 years after delivery in the two groups, randomized to restrictive or liberal use of mediolateral episiotomy. (34)

The clinical relationship between mediolateral episiotomies and third degree perineal tears has been investigated. Harrison et al randomized 181 women to receive either a routine or indicated episiotomy. A lower incidence of tears occurred in the restricted use policy (0%) compared to the liberal episiotomy group policy(5.6%).The investigators questioned the value of routine episiotomy in primigravid patients but leave the ultimate decision to the birth attendant. They support the association of an increase in perineal damage when mediolateral episiotomy is liberal and they advocate restricting the use of episiotomy as a mechanism to decrease perineal trauma in labour. (24)

The Argentine Collaborative trial involved both nulliparous and parous women delivered at eight Argentine hospitals who were randomized to mediolateral episiotomy or no intervention unless indicated by fetal status.28% fewer women in the restrictive episiotomy group required perineal repairs. The authors concluded that there was no evidence to show that routine episiotomy use decreased the perineal trauma. (35)

The Childbirth and Pelvic floor dysfunction study conducted in the University of Michigan by Divya et al reported that the laceration of the external anal sphincter during vaginal delivery is a risk factor for incontinence of flatus or feces. The coexistence of unrecognized injury to the internal anal sphincter may explain the reason that upto one half of parturients subsequently experience fecal incontinence even after repair of a recognized sphincter laceration. (37)

A prospective single blind study of the exoanal ultrasound of the anal sphincter: normal anatomy and sphincter defects was done in Michigan USA by Ursula et al . A convex scanner was placed on the perineum of women in lithotomy position. Images were taken at three levels of the anal sphincter canal. The internal anal sphincter is visible as a hypoechoic circle, the external anal sphincter show a hyperechoic pattern. Proximally the sling of the puborectalis muscle is visible. Sphincter defects were detected in 20 women. They concluded that exoanal ultrasound provides information on normal anatomy and on defects of the anal sphincter. (39)

In 2005, Timor et al conducted a simple ultrasound evaluation of the anal sphincter in female patients using a trans vaginal transducer they used a trans vaginal probe with the footprint placed in the transverse and then in a median (sagittal) plane. If seen, the combined internal and external anal sphincter thickness at the 12o'clock location was measured. In patients with third or fourth degree lacerations there was thinning or discontinuous sphincter anatomy at the 12o' clock position. . All patients symptomatic for fecal incontinences showed abnormal sphincter anatomy and the anal mucosa on the transverse section was deformed. (40)

In a prospective study of 106 women from Childbirth and Pelvic symptoms imaging supplementary study, who had third or fourth degree lacerations at delivery and endoanal ultrasound 6-12 months postpartum, Bradley et al 2007 concluded that fourth degree tears and episiotomy are associated with more frequent sonographic IAS gaps.(41)

A literature review conducted by DanValsky and Simcha Yagel (25)from Israel in March 2007 concluded that a 5- to 9-MHz 3D vaginal probe, placed in the area of the fourchette, is the most effective for examination of the anorectum by the transperineal approach. A 4- to 8-MHz 3D abdominal probe is also suitable. An empty rectum improves evaluation.

In the transverse plane, the internal sphincter appears as a hypoechoic ring, and the external sphincter appears as a ring of mixed echogenicity.

The puborectalis muscle is visualized as a U-shaped echogenic area surrounding the ES posteriorly near the anorectal junction, forming the anorectal angle. The mucous folds are visible as structures of mixed echogenicity with a characteristic radiation from the central area, or "star sign." This star appearance of the mucous folds is most clearly seen in the area of the anal columns (above the dentate line), 1 to 1.5 cm from the anal verge.

Transperineal ultrasound in males and transvaginal ultrasound in females have been used by the surgeons to evaluate the anal sphincter in patients with perianal inflammatory disease and anal fistulae as endo anal ultrasonography in these patients is limited by pain.

Sharon Maslovitz in 2007 conducted a study to evaluate the clinical significance of postpartum anal sphincter damage by transperineal ultrasonography (TPUS) performed on the day of delivery .Continence questionnaires were handed out and TPUS was performed on 154 consecutive primiparous women 6 – 24 hours after vaginal delivery. At 2 and 6 months later, complaints and sphincteric and sonographic appearance were reassessed. The puerperal women's clinical status and sonographic findings in the immediate and late postpartum period were evaluated.TPUS findings on the day of delivery are related to long term anorectal complaints,supporting a potential role for TPUS as a screening aid for anal sphincter tears. (42)

Gregory et al used the fact that significant nerve injury to a muscle can be associated with muscle atrophy and volume loss and analysed muscle volume using three-dimensional (3D) ultrasound .They measured the length of the external anal sphincter (EAS) from a mid sagittal image, and the width of the EAS and internal anal sphincter (IAS) from axial images at mid anal canal. The EAS volume was calculated by repetitively outlining only the EAS in each sequential axial view.They concluded that quantitative 3D ultrasound of the anal sphincter is moderately reproducible. (43)

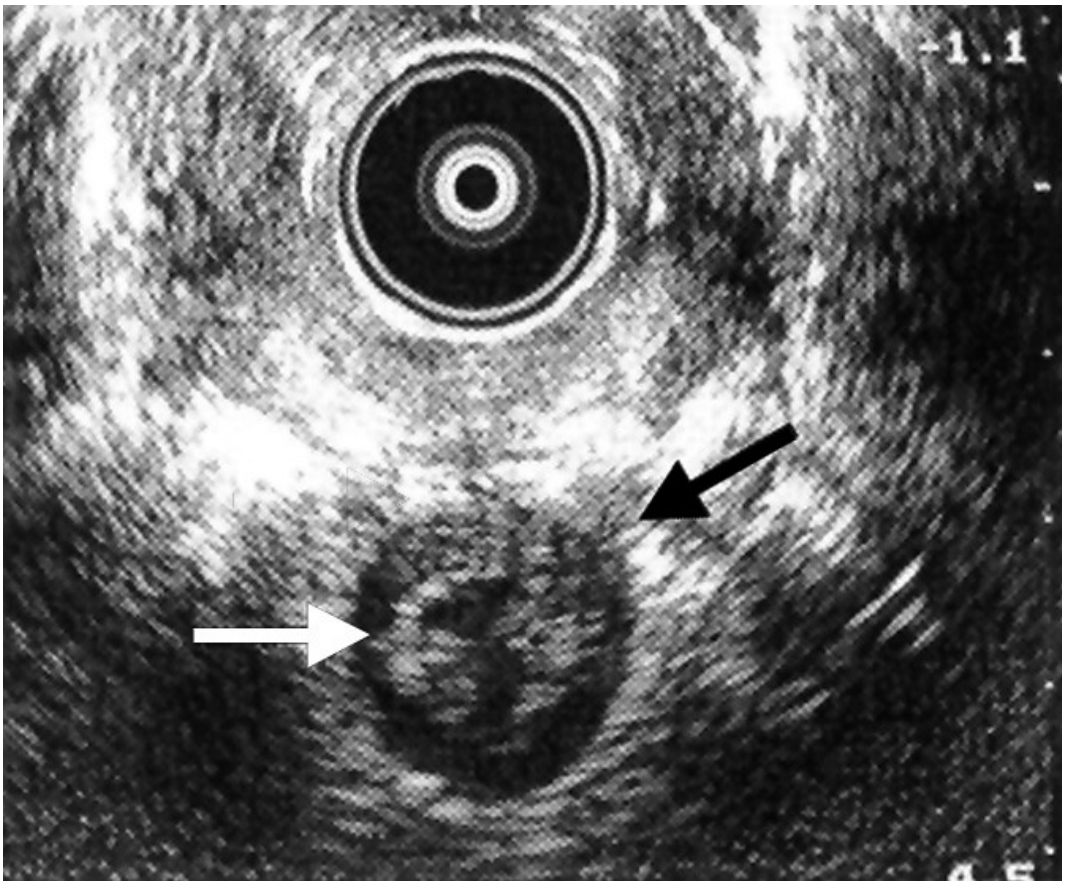
In 1994 Sultan et al conducted a study to evauate vaginal endosonography. Although anal endosonography provides clear images of anal sphincters, the probe in the anal canal may distort epithelial structures and sphincter muscles may be compressed, producing inaccurate muscle thickness measurements. The aim of this study was to describe an approach using vaginal endosonography to image the anal canal undistorted. The undisturbed anorectum, submucosa, anal cushions, and anal sphincter muscles were clearly visualized by vaginal endosonography, and anatomy was described. They concluded that vaginal endosonography is a technique

that enables accurate imaging of anal sphincters and epithelial structures at rest.

In 1997 Lori and Stephanie conducted a study to validate the use of transvaginal sonography for anal sphincter evaluation,and to compare this technique with the more commonly used transanal technique. The study population consisted of 50 women, of whom 44 prospectively underwent transanal and transvaginal sonography. The six remaining patients with surgical confirmation underwent only transvaginal sonography, defects in the external and internal anal sphincters, the status of the perineal body, and any perianal collections or fistulas were documented. The authors concluded that transvaginal sonography is a reliable method for evaluating the anal sphincter, with an accuracy equivalent to that of the transanal technique.

Alexander AA et al evaluated transvaginal ultrasonography (US) as an alternative to transanal US for determining the anatomic cause of fetal incontinence in women. Transvaginal US of the anal canal was performed in 28 women (aged 27-74 years) with fecal incontinence. The internal anal sphincter (IAS) and external anal sphincter muscles were imaged as independent bands in all 28 patients. The calculated mean thickness of the IAS in patients aged younger than 55 years was not significantly different from that in patients aged older than 55 years (P=.31). All muscle disruptions, fistulas, and abscesses were surgically confirmed. They concluded that transvaginal US enables determination of the anatomic cause of fecal incontinence, allowing the surgeon to select patients who would benefit form surgical repair.

Ramirez in 2005 reported that endoanal ultrasound scans of the high and medium anterior anal canal in women cannot obtain good images, mainly due to normal variants of the female anatomy. Vaginal endosonography allows to image the anal canal with no disturbance. Endovaginal ultrasound should be considered an option for women when doubts exist about the integrity of the anterior anal canal.



Normal endoanal ultrasound (above)

Normal endovaginal ultrasound (below). It is possible to identify the external (black arrow) as well as the internal (white arrow) anal sphincter

Normal transverse scanning planes of the anal sphincter complex (**a**) at the anal verge and the ES (**b**) at the midpoint of the anal canal, where measurements are usually taken. M indicates mucous folds (**c**) at the most proximal area to the anorectal junction.

AIM OF THE STUDY

AIM OF THE STUDY

To evaluate the anal sphincter complex in primiparous women prenatally and postnatally using transperineal ultrasound using a transvaginal transducer and compare the same between the mothers who had an episiotomy at delivery and those who did not have an episiotomy at delivery.

MATERIALS
METHODS

MATERIALS AND METHODS

Primiparous women at term before delivery were evaluated for anal sphincter thickness both external and internal and for sphincter integrity

Among the primiparous women 46.445% underwent a primary cesarean section. Of the 53.555% of primiparous women who delivered vaginally 87.97% had an episiotomy during delivery.

Those women who delivered vaginally were evaluated again immediately after delivery. Postnatally these women were divided to two groups.

Group I consisted of mothers who delivered vaginally with an episiotomy. The episiotomy is always mediolateral. This is the practice in our institution.

Group II consisted of women who delivered vaginally without an episiotomy. These women may or may not have perineal lacerations.

These women were then asked to come for follow up 4 weeks later for a postpartum evaluation. Forty women in each group were evaluated postpartum.

The ultrasound was done using a transvaginal transducer available in the Department of Obstetrics and Gynaecology in Kilpauk Medical College and Hospital.

It was a 6.5 MHz Probe made by Larsen – Toubro Limited.

The External anal sphincter thickness and internal anal sphincter thickness were measured at 12 o’ clock, 3 o’ clock, 6 o’ clock and 9 o’ clock

positions in the transverse plane. The average external and internal anal sphincter thickness was then calculated. The combined anal sphincter thickness was derived.

This was then compared between the various groups.

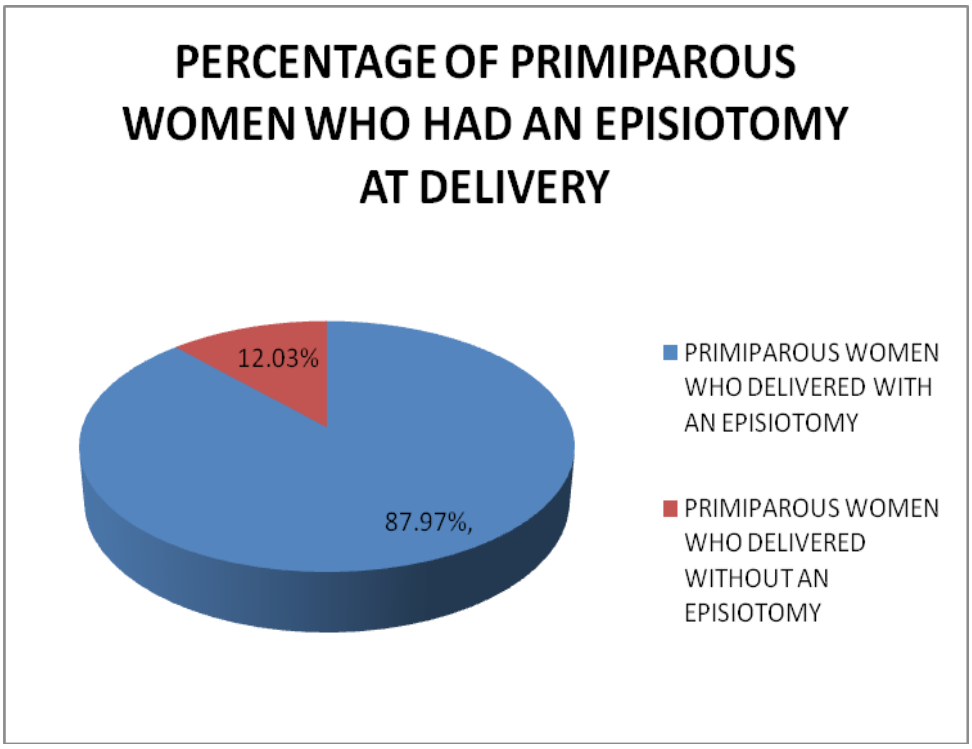
PATIENT INCLUSION CRITERIA

1. Primiparous women
2. Age group -15-35
3. Mode of delivery – vaginal
4. With or without episiotomy
5. With or without perineal lacerations

PATIENT EXCLUSION CRITERIA

1. Multiparous woman with previous vaginal delivery – because each vaginal delivery is associated with sphincter damage- to avoid the confounding factor of prior sphincter damage.
2. Instrumental deliveries- as instrumental deliveries are known to cause sphincter damage.
3. History of diabetes
4. History of preexisting neurological dysfunction
5. History of back injury
6. History of surgical treatment of back pain
7. History of abdominopelvic surgery like hemorroidectomy
8. History of radiation.

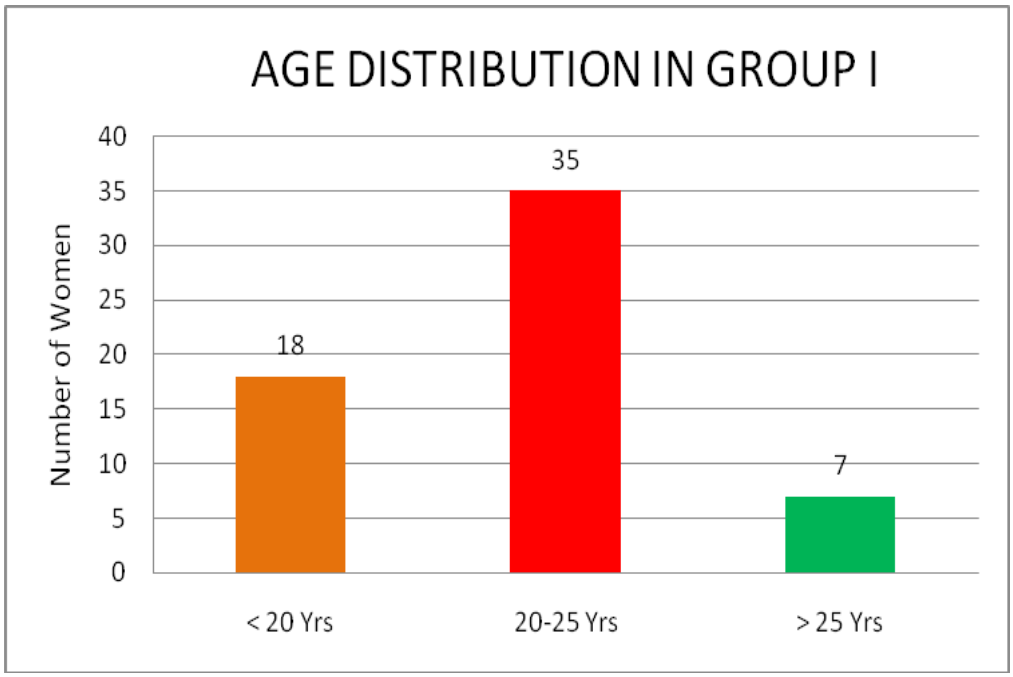
RESULTS



Of all the primiparous women who had a vaginal delivery

87.97% had an episiotomy.

12.03% did not have an episiotomy.

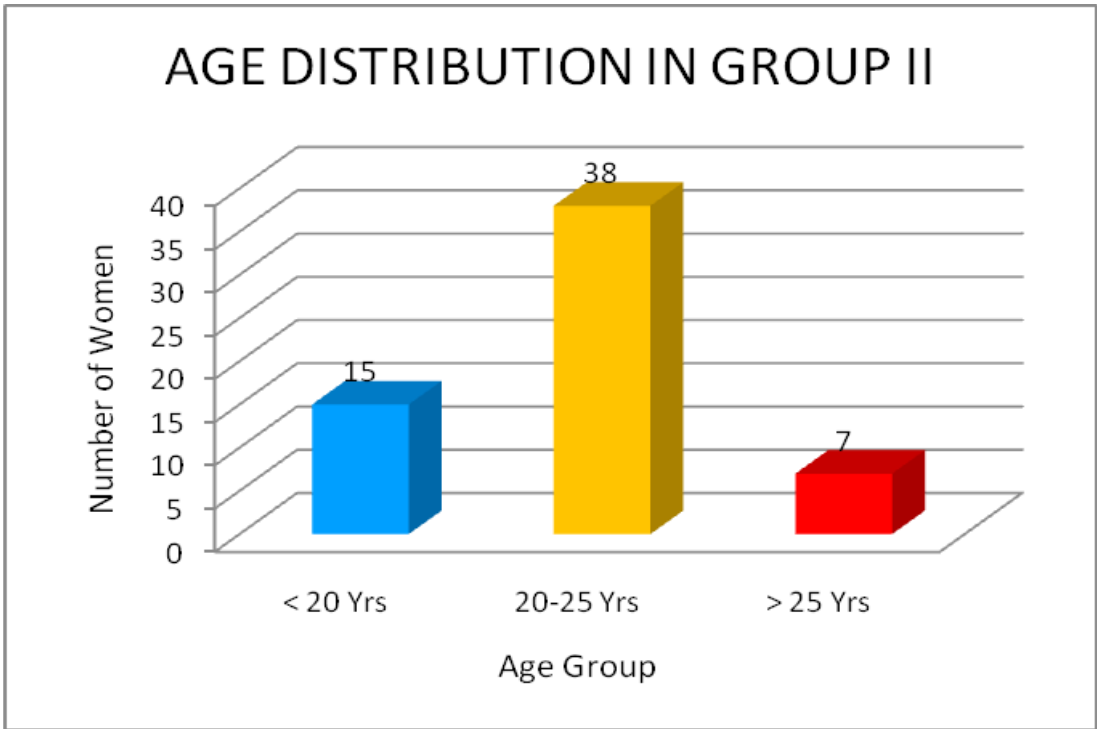


AGE DISTRIBUTION IN GROUP I

TABLE I

Age group in years	Number of Women
< 20 Yrs	18
20-25 Yrs	35
> 25 Yrs	7
Total No of Women	**60**

Most of the women (35) in Group I belong to 20-25 yrs Age group followed by women less than 20yrs (18).

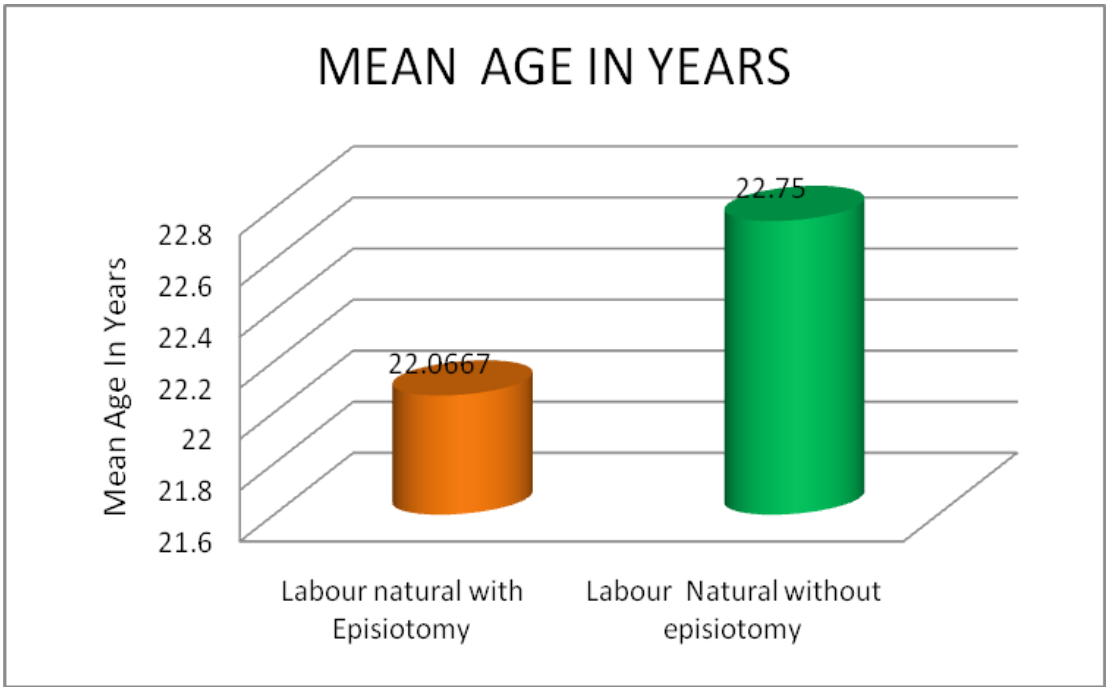


AGE DISTRIBUTION IN GROUP II

TABLE II

Age group in years	Number of Women
< 20 Yrs	15
20-25 Yrs	38
> 25 Yrs	6
Total No of Women	**60**

Most of the women (38) in Group II belong to 20-25 yrs Age group followed by women less than 20yrs (15)



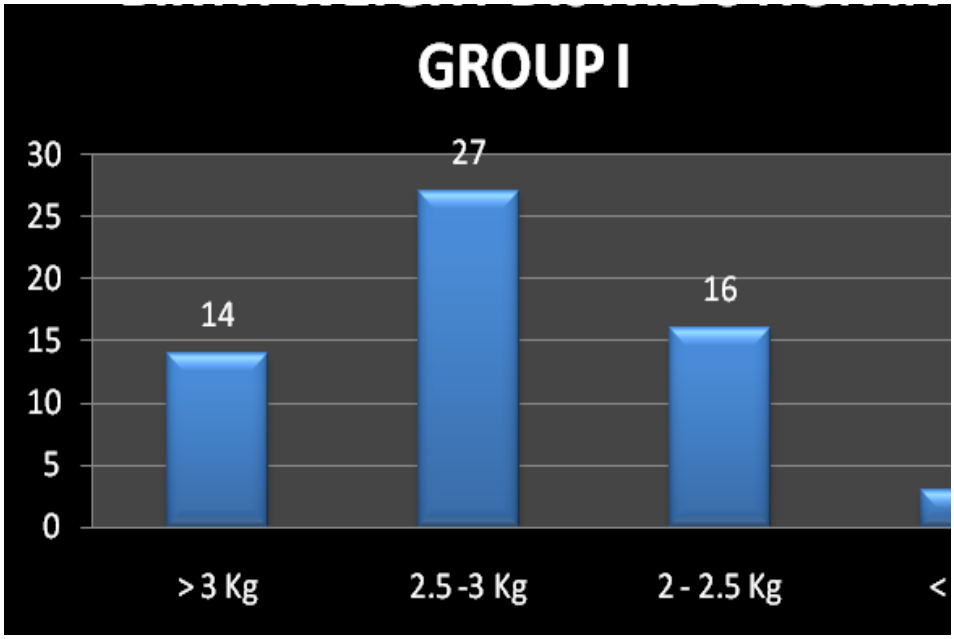
MEAN AGE IN YEARS

TABLE III

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Mean age in years	22.0667	22.75

p = 0.198

There is no significant difference in the mean of the ages between the two groups.

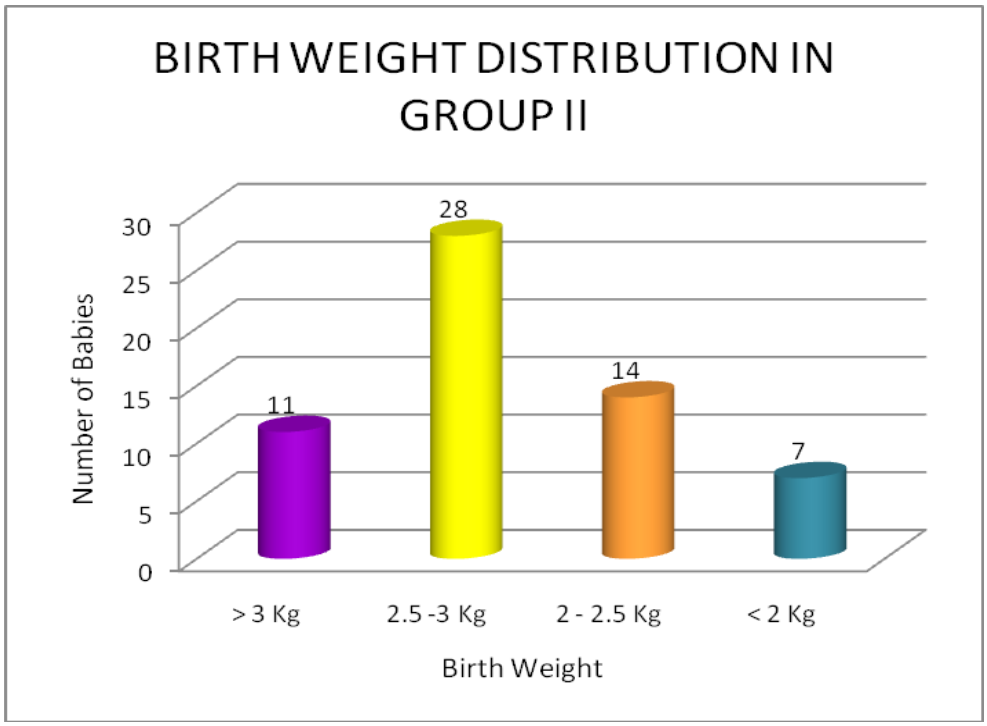


BIRTH WEIGHT DISTRIBUTION IN GROUP I

TABLE IV

Birth Weight	Number of Babies
> 3 Kg	14
2.5- 3 Kg	27
2- 2.5 Kg	16
< 2 Kg	3
Total No of Babies	**60**

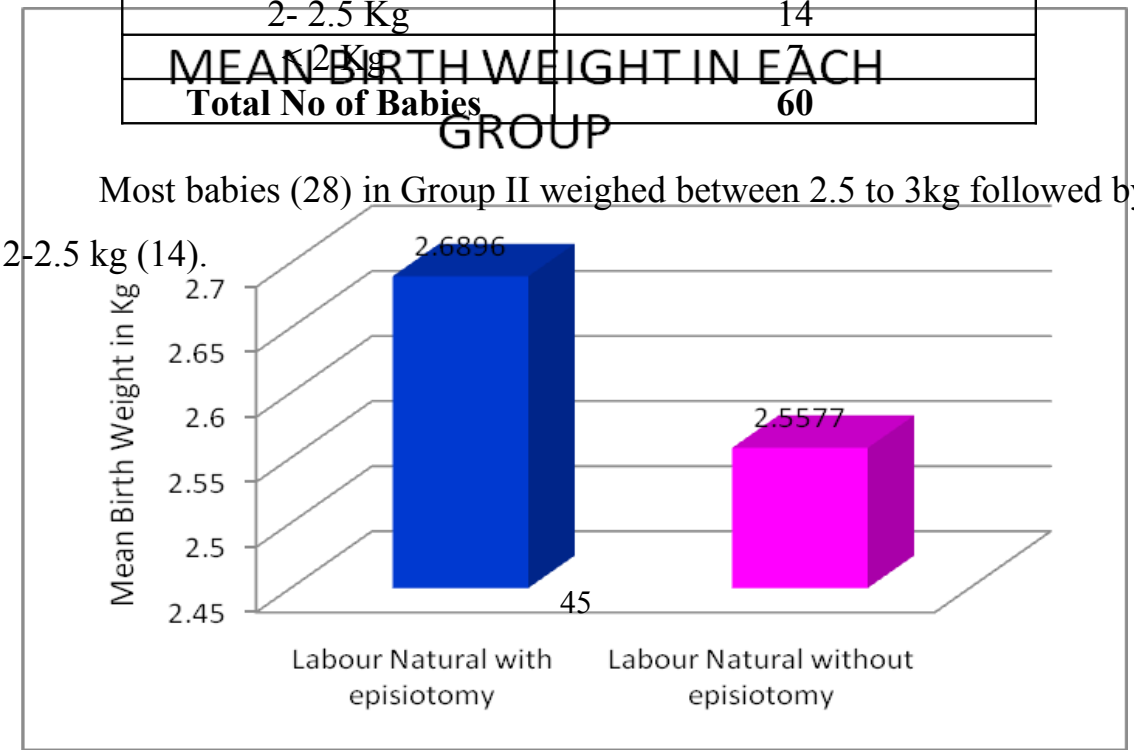
Most babies (27) in Group I weighed between 2.5 to 3kg followed by 2-2.5 kg (16)



BIRTH WEIGHT DISTRIBUTION IN GROUP II

TABLE V

Birth Weight	Number of Babies
> 3 Kg	11
2.5- 3 Kg	28
2- 2.5 Kg	14
< 2 Kg	7
Total No of Babies	**60**



Most babies (28) in Group II weighed between 2.5 to 3kg followed by 2-2.5 kg (14).

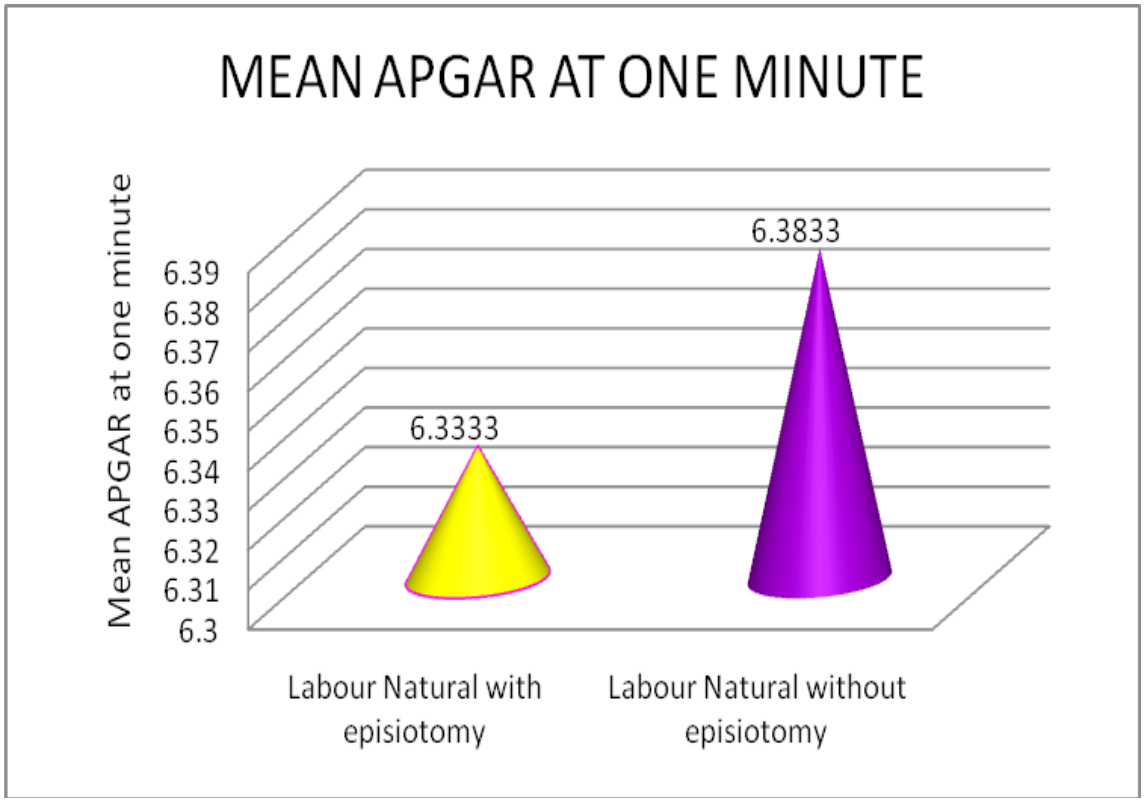
MEAN BIRTH WEIGHT IN EACH GROUP

TABLE VI

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Mean Birth Weight in Kg	2.6896	2.5577

$p = 0.095$

There is no significant difference in the mean of the birth weights between the two groups.



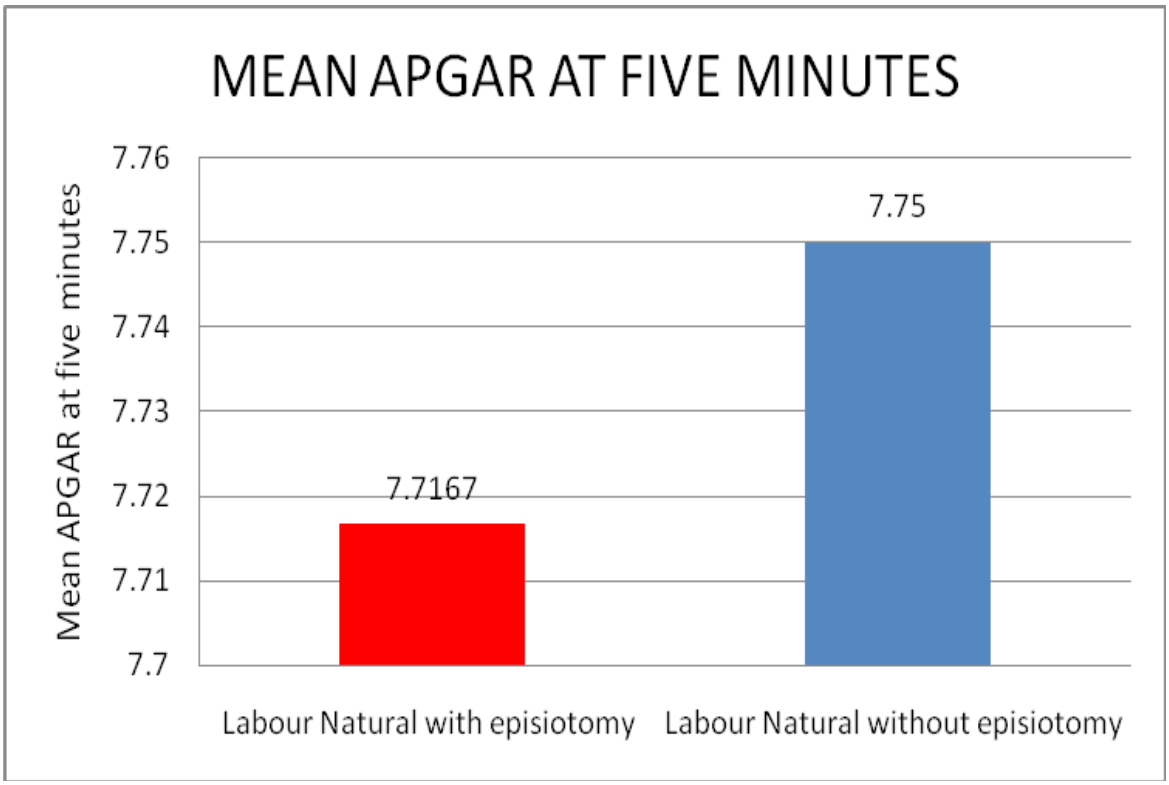
MEAN APGAR AT ONE MINUTE

TABLE VII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Mean APGAR at one minute	6.3333	6.3833

p = 0.748

There is no significant difference in the mean of the APGAR at one minute between the two groups.



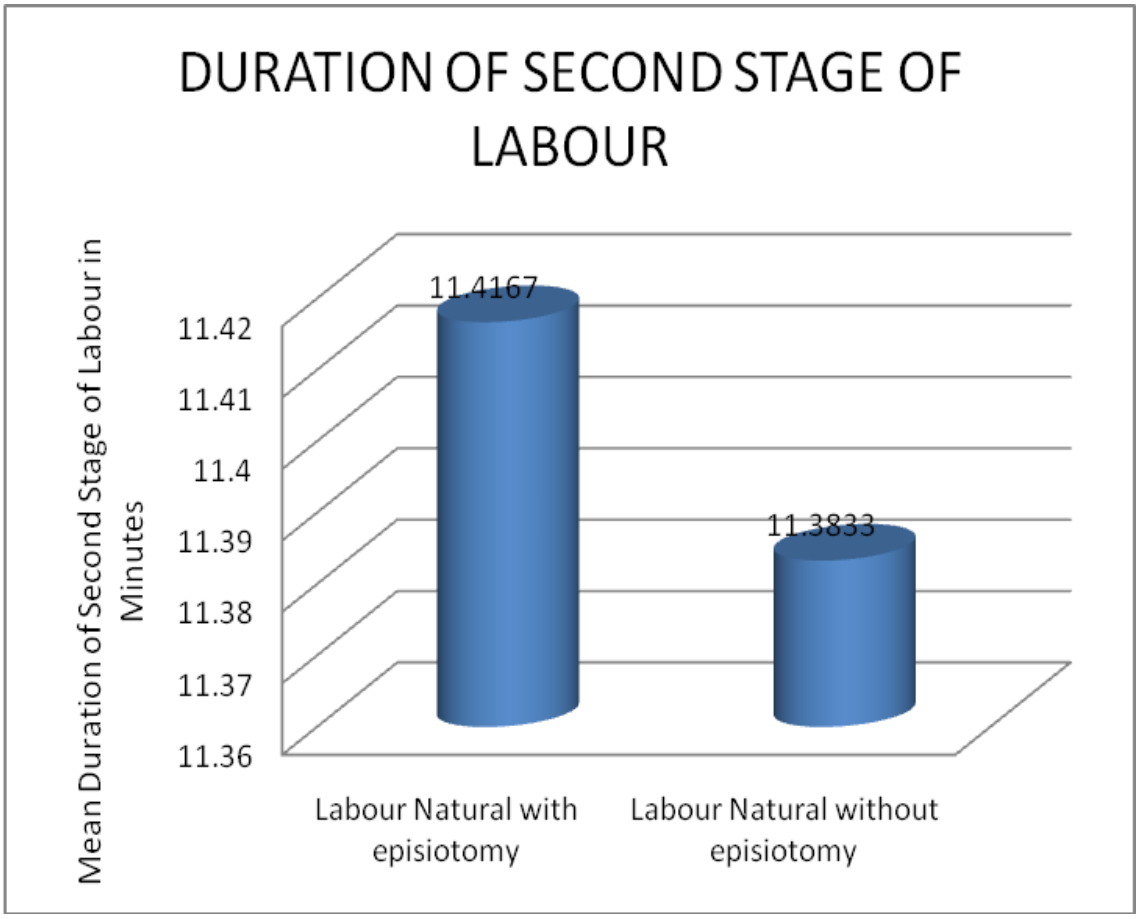
MEAN APGAR AT FIVE MINUTES

TABLE VIII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Mean APGAR at Five Minutes	7.7167	7.75

p = 0.801

There is no significant difference in the mean of the APGAR at five minutes between the two groups.



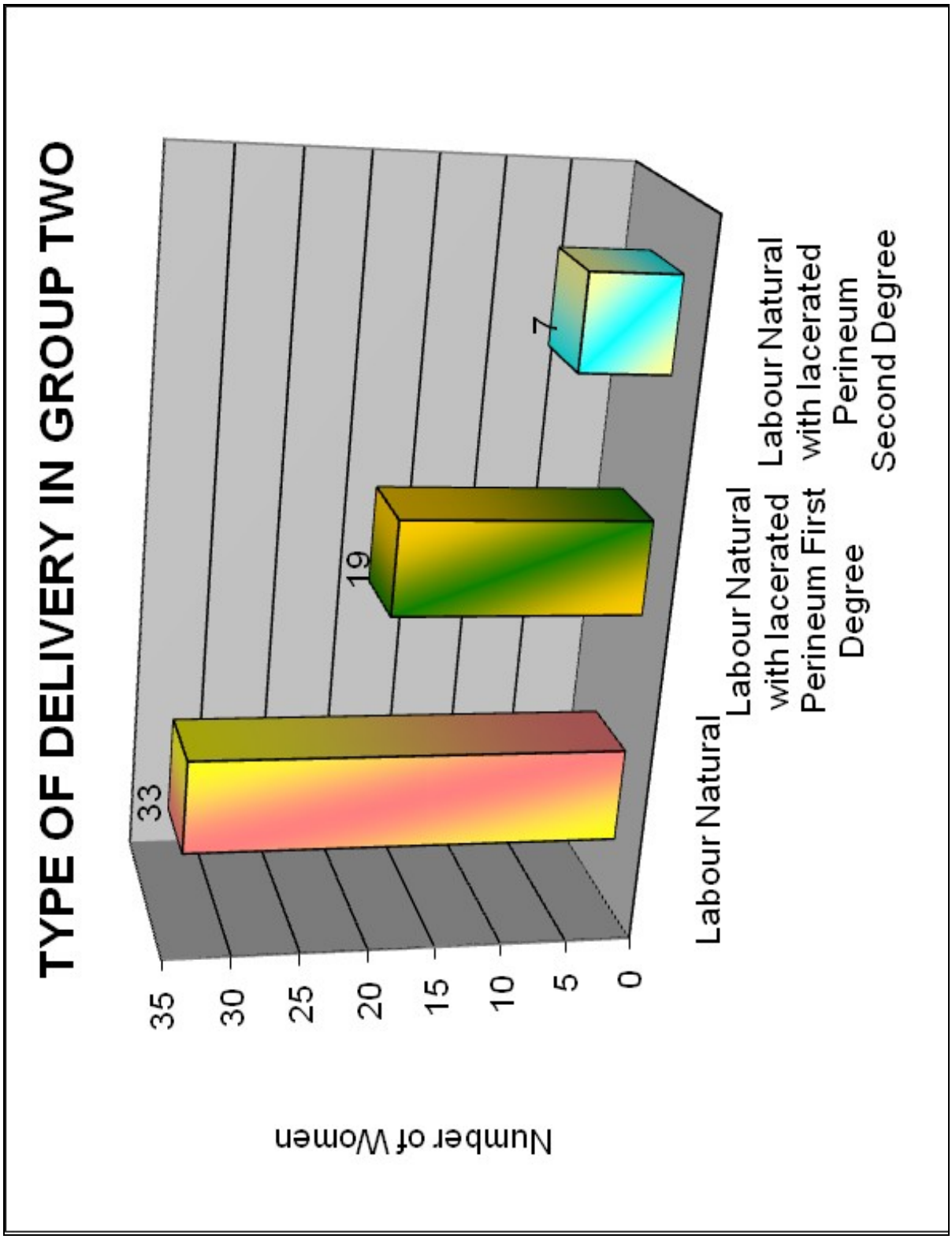
DURATION OF SECOND STAGE OF LABOUR

TABLE IX

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Mean Duration of Second Stage of Labour in Minutes	11.4167	11.3833

p = 0.949

There is no significant difference in the mean of the duration of second stage of labour in minutes between the two groups.


TYPE OF DELIVERY IN GROUP TWO
Number of Women
35
30
25
20
15
10
5
0
33
19
7
Labour Natural
Labour Natural with lacerated Perineum First Degree
Labour Natural with lacerated Perineum Second Degree

All deliveries in group I were labour natural with episiotomy.

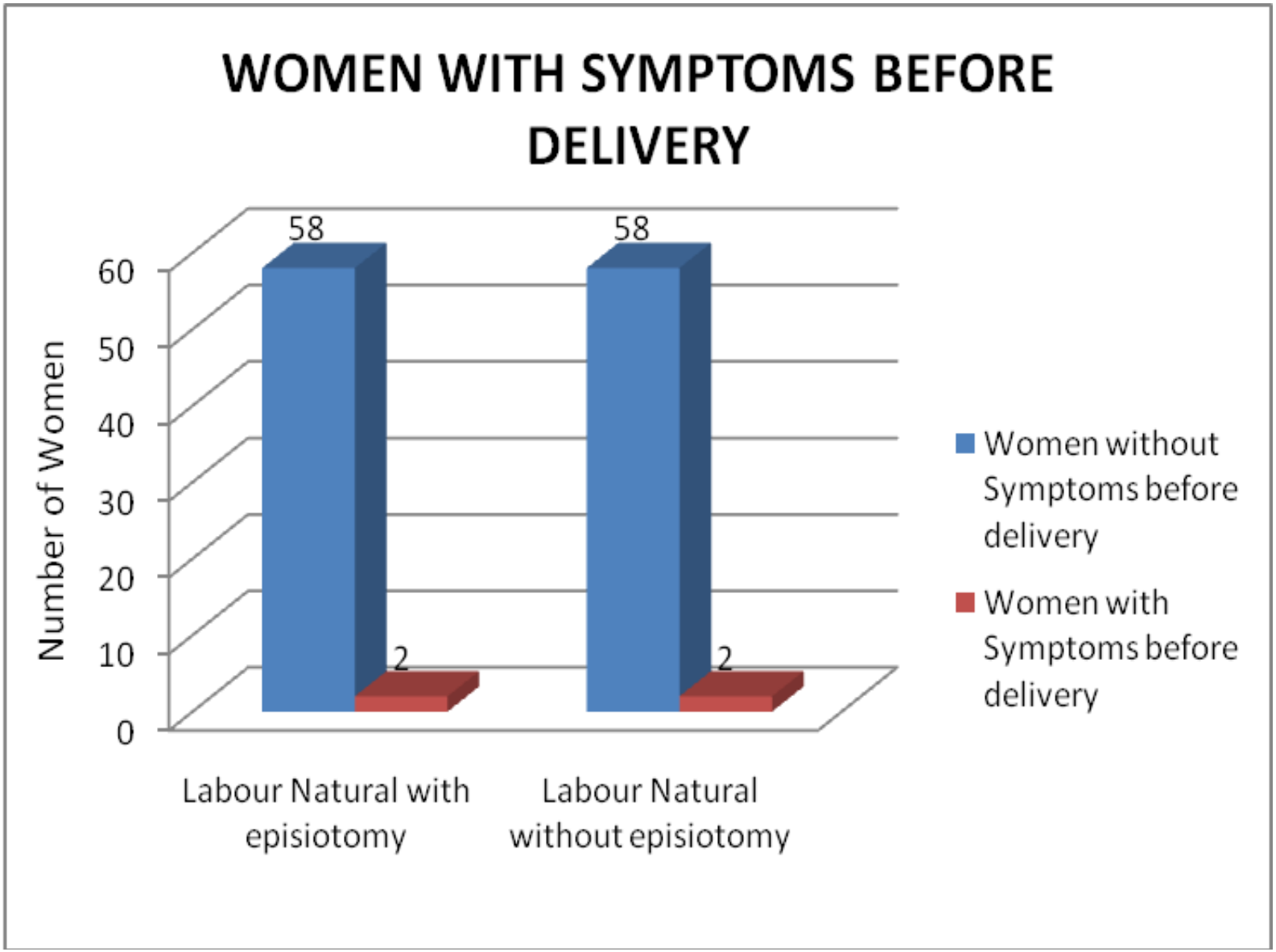
Deliveries in Group II were of 3 types. The results are as follows

TYPE OF DELIVERY IN GROUP TWO

TABLE X

	Labour Natural	**Labour Natural with lacerated Perineum First Degree**	**Labour Natural with lacerated Perineum Second Degree**
Number of Women	33	19	7

Most of the deliveries in group II were labour natural (33) followed by labour natural with lacerated perineum first degree


WOMEN WITH SYMPTOMS BEFORE DELIVERY
Number of Women
60
50
40
30
20
10
0
58
2
58
2
Labour Natural with episiotomy
Labour Natural without episiotomy
Women without Symptoms before delivery
Women with Symptoms before delivery

WOMEN WITH SYMPTOMS BEFORE DELIVERY

All the women in both groups were evaluated for the following symptoms before delivery and for new symptoms after delivery and post partum

1. Passing flatus when undesirable
2. Any incontinence of liquid stool
3. Any need to wear a pad because of anal symptoms
4. Any fecal urgency
5. Any extra anal leakage
6. Any leakage of material other than stool

TABLE XI

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Women without Symptoms before delivery	58	58
Women with Symptoms before delivery	2	2
Total Number of Women	**60**	**60**

Two patients had symptoms before delivery in group I. both of them were passing flatus when undesirable.

Two patients had symptoms before delivery in group II. Both of them were passing flatus when undesirable.

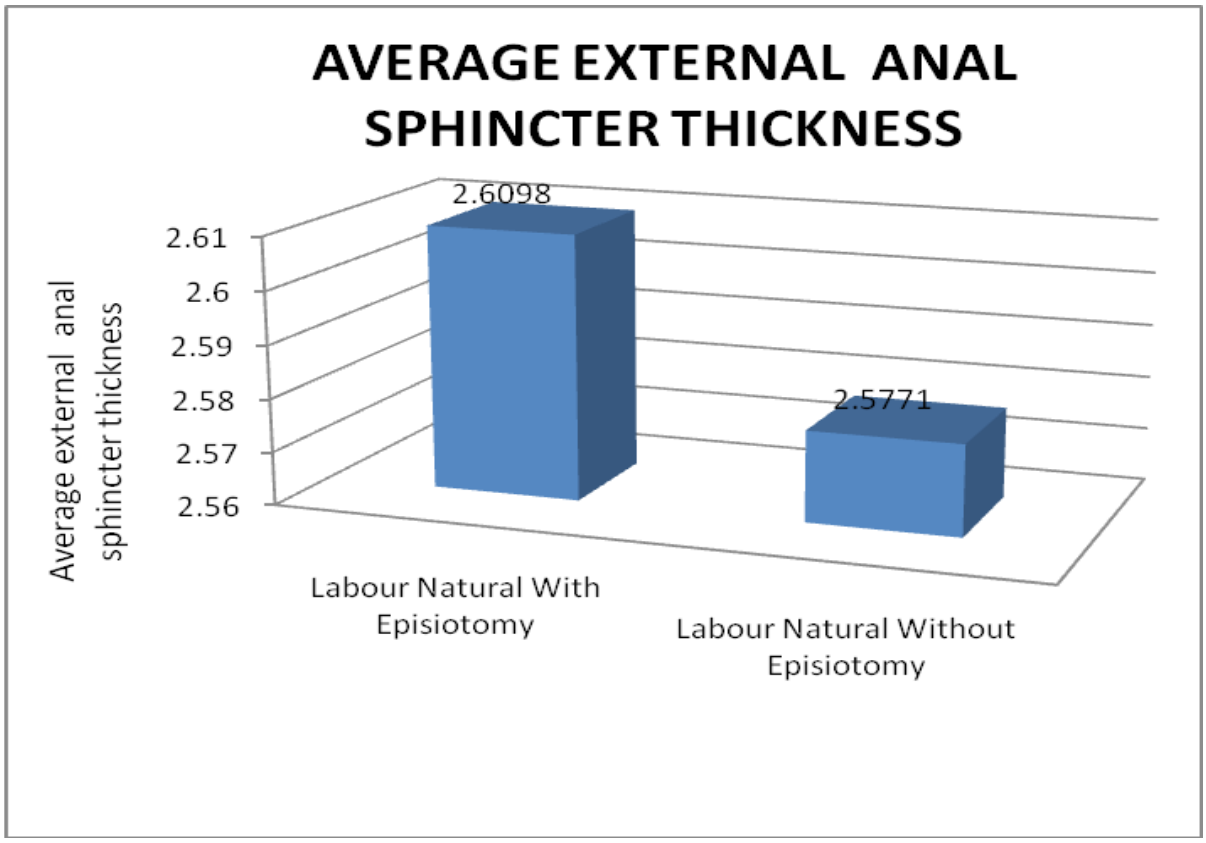
Thus the most common symptom before delivery was passing flatus when undesirable.

SIGNS BEFORE DELIVERY

All the women in both groups were evaluated for the following signs before delivery and for new signs after delivery and post partum.

1. Perianal soiling
2. Absence of cutaneous anal reflex
3. Patulous anus
4. Local scarring

None of the women in both the groups had any signs before delivery.



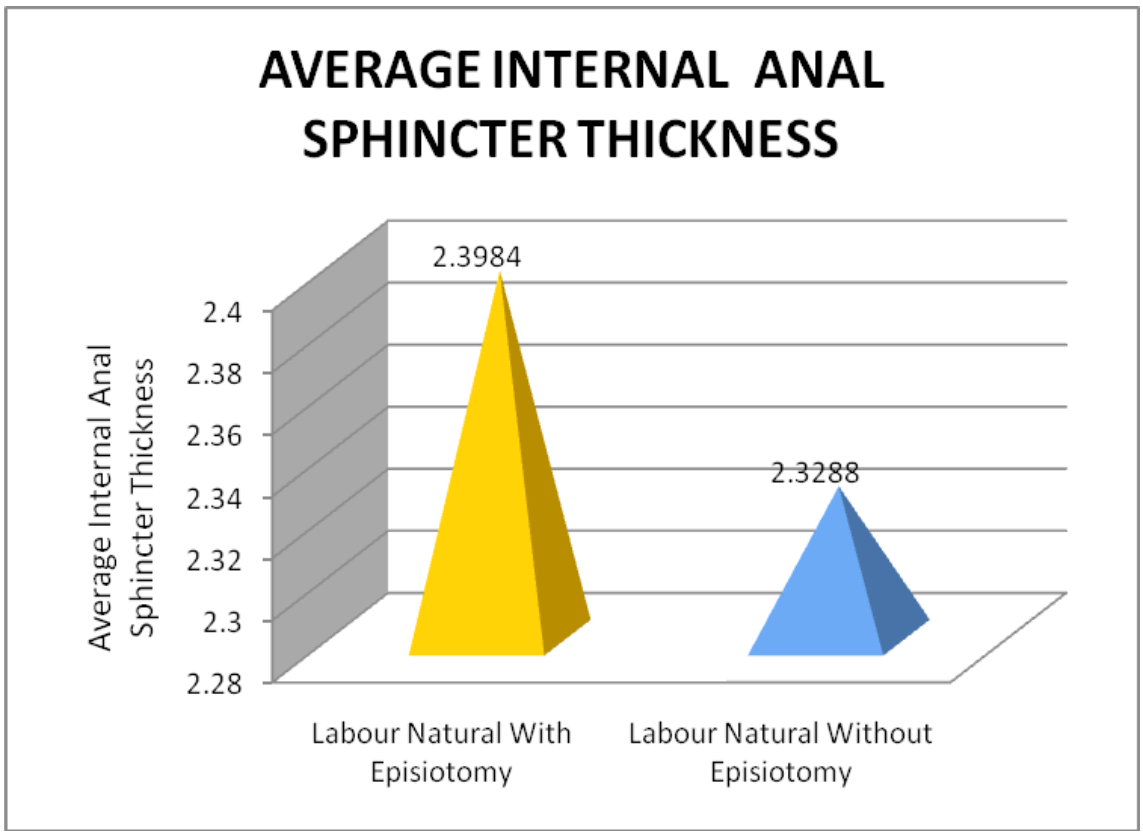
AVERAGE EXTERNAL ANAL SPHINCTER THICKNESS BEFORE DELIVERY IN MM

TABLE XII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average external anal Sphincter Thickness in mm	2.6098	2.5771

p = 0.676

There is no significant difference in the mean of the average external anal sphincter thickness before delivery between the two groups.



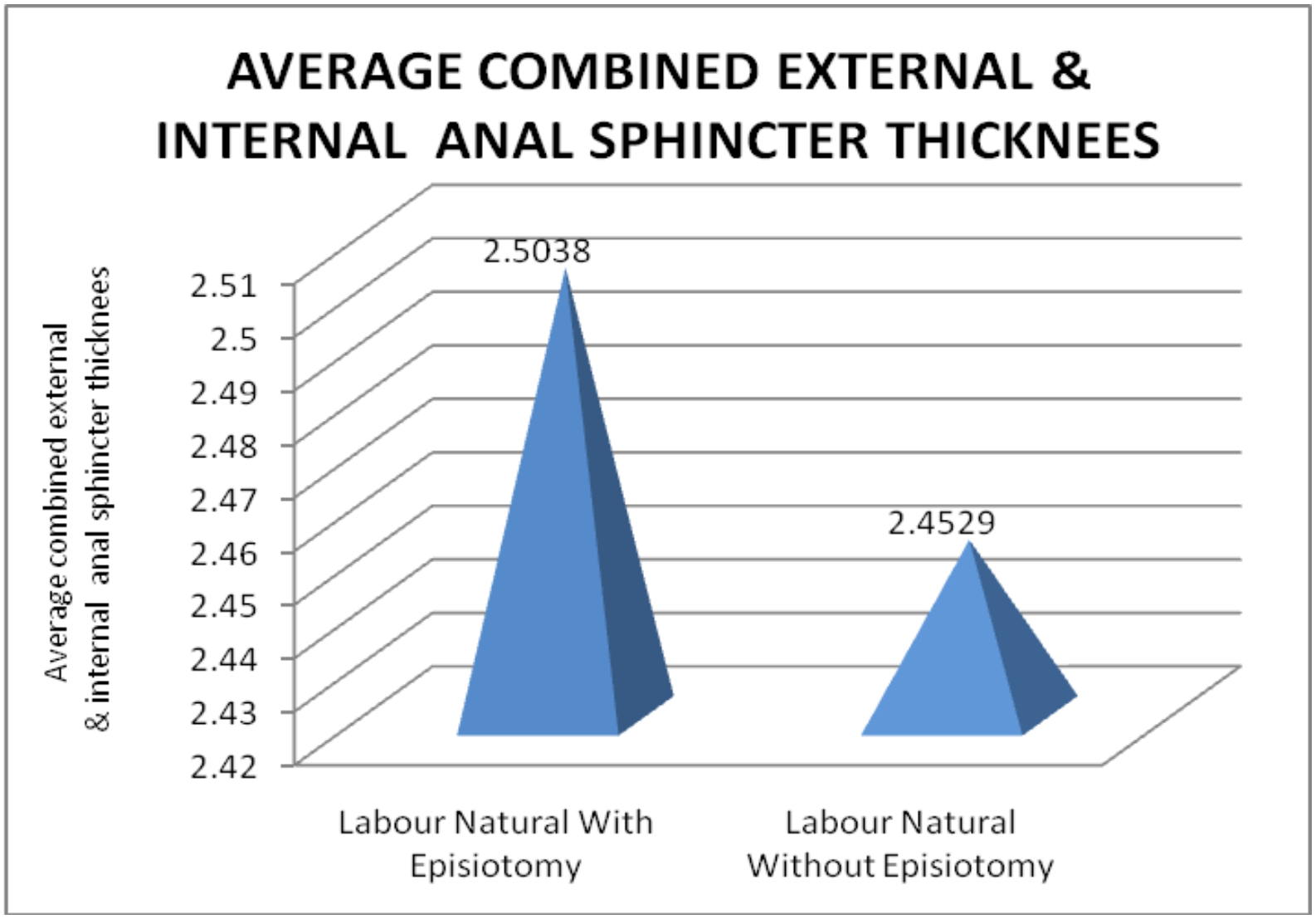
AVERAGE INTERNAL ANAL SPHINCTER THICKNESS BEFORE DELIVERY IN MM

TABLE XIII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average Internal Anal Sphincter Thickness in mm	2.3984	2.3288

p = 0.2

There is no significant difference in the mean of the average internal anal sphincter thickness before delivery between the two groups.


AVERAGE COMBINED EXTERNAL & INTERNAL ANAL SPHINCTER THICKNEES
Average combined external & internal anal sphincter thicknees
2.51
2.5
2.49
2.48
2.47
2.46
2.45
2.44
2.43
2.42
2.5038
2.4529
Labour Natural With Episiotomy
Labour Natural Without Episiotomy

AVERAGE COMBINED EXTERNAL & INTERNAL ANAL SPHINCTER THICKNESS BEFORE DELIVERY IN MM

TABLE XIV

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average Combined External & Internal Anal Sphincter Thickness In mm	2.5038	2.4529

p = 0.384

There is no significant difference in the mean of the average combined external and internal anal sphincter thickness before delivery between the two groups.

SPHINCTER INTEGRITY BEFORE DELIVERY

All women had intact sphincters before delivery in both groups

WOMEN WITH NEW SYMPTOMS AFTER DELIVERY

Women in both groups were evaluated for new symptoms after delivery

None of the women in the two groups developed any new symptoms after delivery


WOMEN WITH SIGNS AFTER DELIVERY
Number of women
60
50
40
30
20
10
0
57
3
57
3
Labour Natural with episiotomy
Labour Natural without episiotomy
Women without Signs after delivery
Women with Signs after delivery

WOMEN WITH SIGNS AFTER DELIVERY

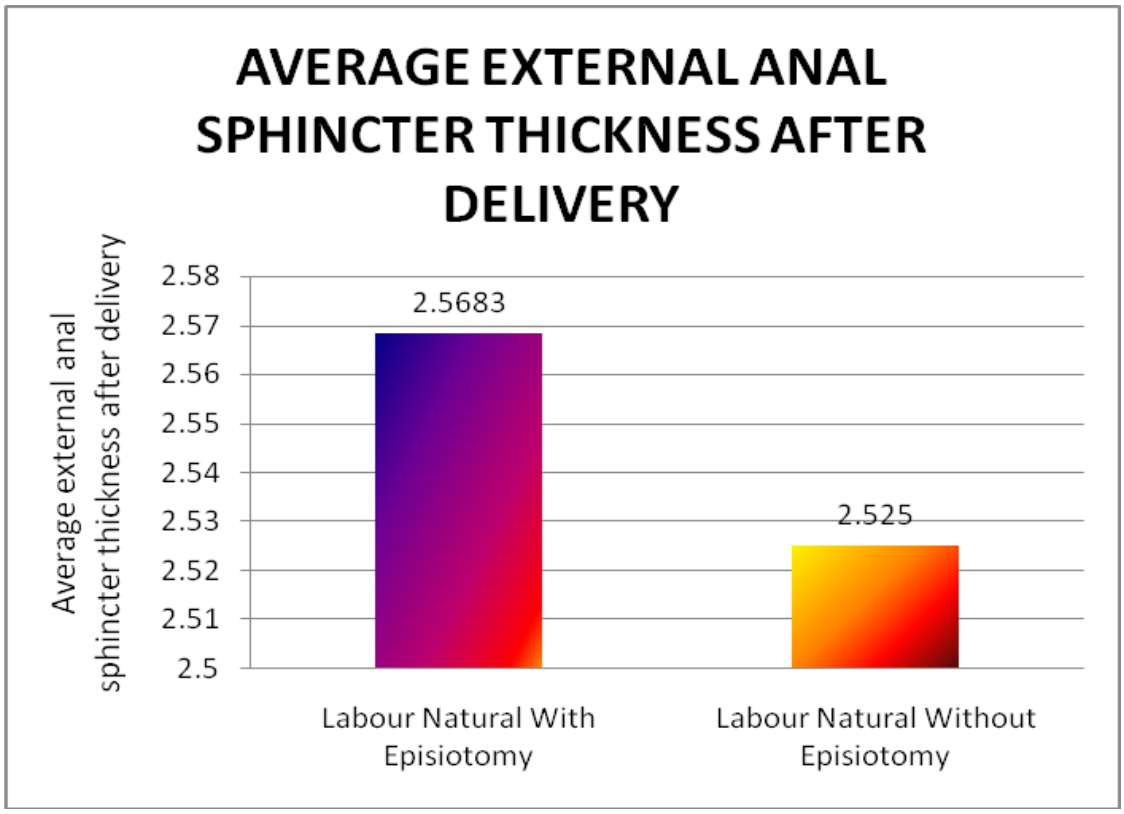
TABLE XV

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Women without Signs after delivery	57	57
Women with Signs after delivery	3	3
Total Number of Women	**60**	**60**

Three women in each group had signs of sphincter damage after delivery.

In the group of women who had labour natural with episiotomy one woman had patulous anus and two had perianal soiling.

In the group of women who had labour natural without episiotomy one woman had absence of cutaneous anal reflex, one woman had patulous anus and one had perianal soiling.



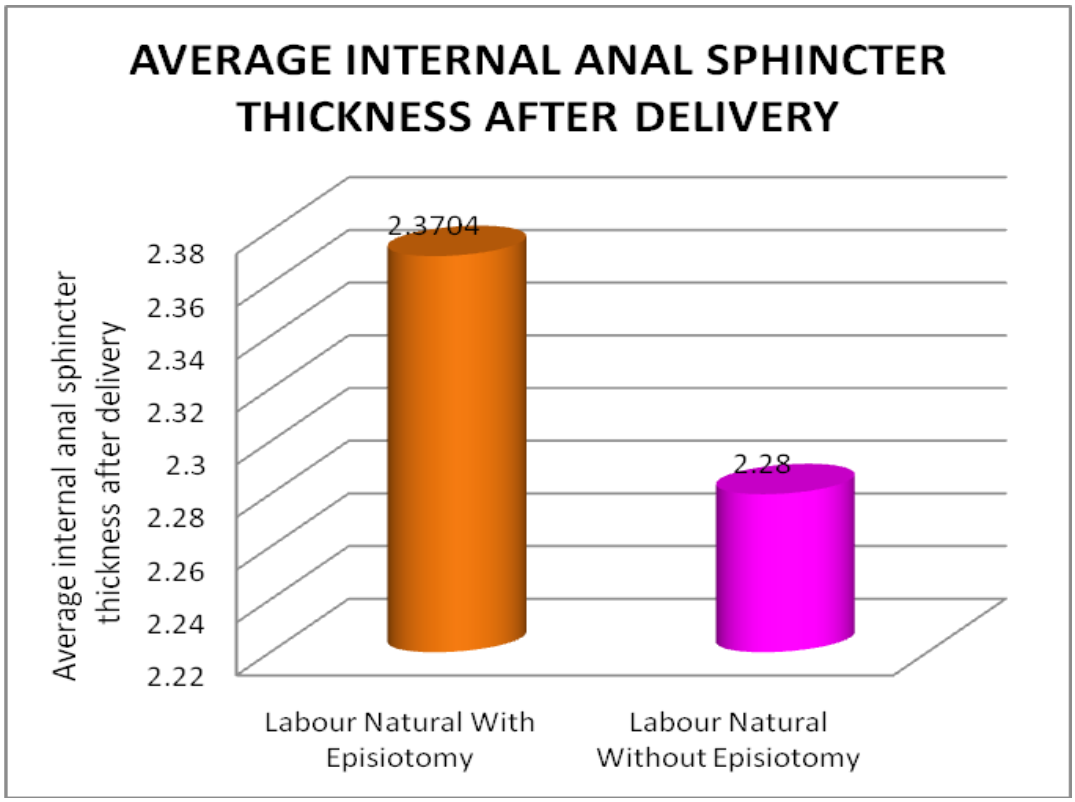
AVERAGE EXTERNAL ANAL SPHINCTER THICKNESS AFTER DELIVERY IN MM

TABLE XVI

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average External Anal Sphincter Thickness after Delivery In mm	2.5683	2.5250

p = 0.581

There is no significant difference in the mean of the average external anal sphincter thickness after delivery between the two groups.



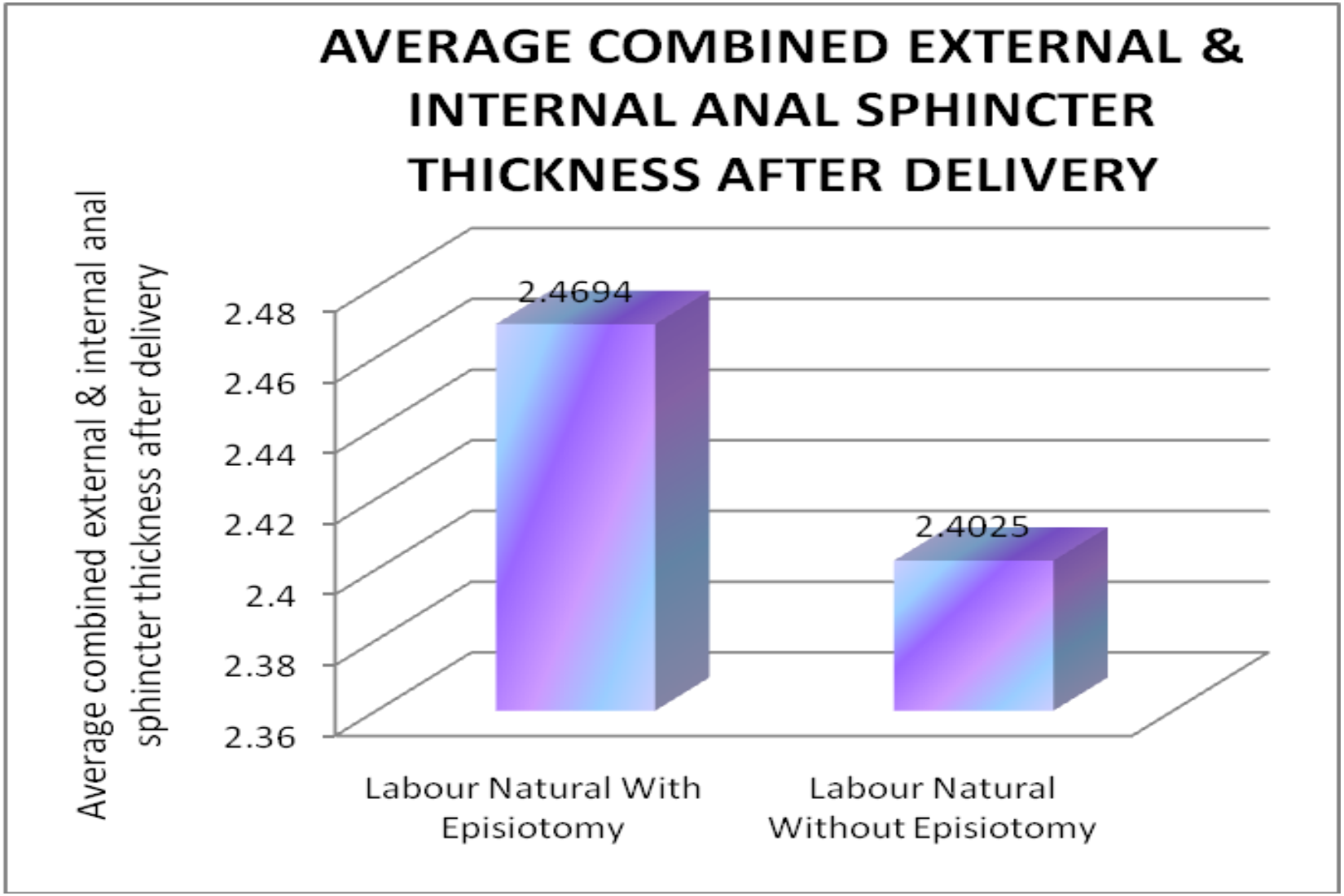
AVERAGE INTERNAL ANAL SPHINCTER THICKNESS AFTER DELIVERY IN MM

TABLE XVII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average Internal Anal Sphincter Thickness after Delivery In mm	2.3704	2.28

p = 0.113

There is no significant difference in the mean of the average internal anal sphincter thickness after delivery between the two groups.


AVERAGE COMBINED EXTERNAL & INTERNAL ANAL SPHINCTER THICKNESS AFTER DELIVERY
Average combined external & internal anal sphincter thickness after delivery
2.48
2.46
2.44
2.42
2.4
2.38
2.36
2.4694
2.4025
Labour Natural With Episiotomy
Labour Natural Without Episiotomy

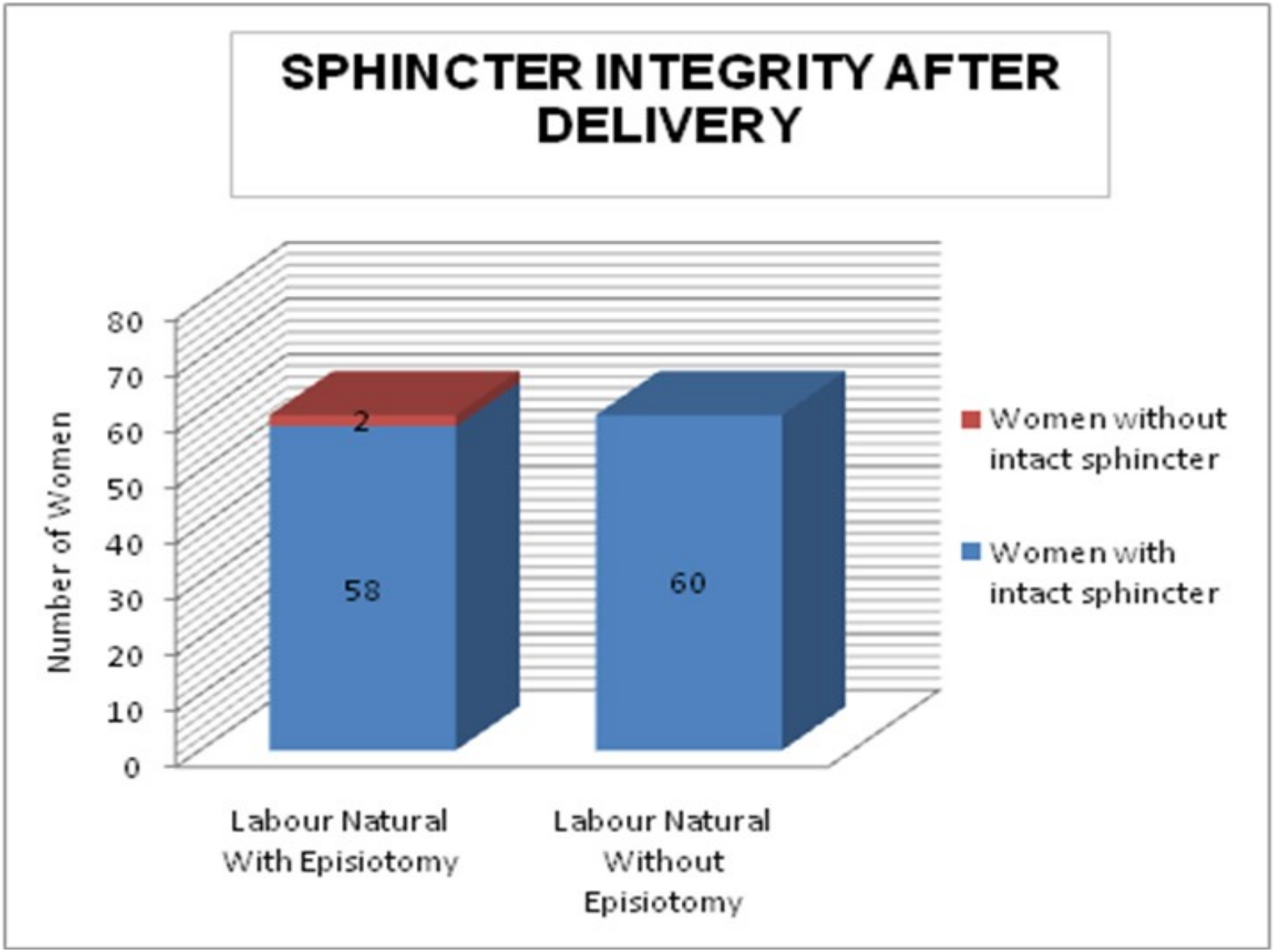
AVERAGE COMBINED EXTERNAL & INTERNAL ANAL SPHINCTER THICKNESS AFTER DELIVERY

TABLE XVIII

	Labour Natural with Episiotomy	**Labour Natural without Episiotomy**
Average Combined External & Internal anal Sphincter Thickness after Delivery	2.4694	2.4025

p = 0.252

There is no significant difference in the mean of the average combined external and internal anal sphincter thickness after delivery between the two groups.


SPHINCTER INTEGRITY AFTER DELIVERY
Number of Women
0
10
20
30
40
50
60
70
80
2
58
60
Labour Natural With Episiotomy
Labour Natural Without Episiotomy
Women without intact sphincter
Women with intact sphincter

SPHINCTER INTEGRITY AFTER DELIVERY

TABLE XIX

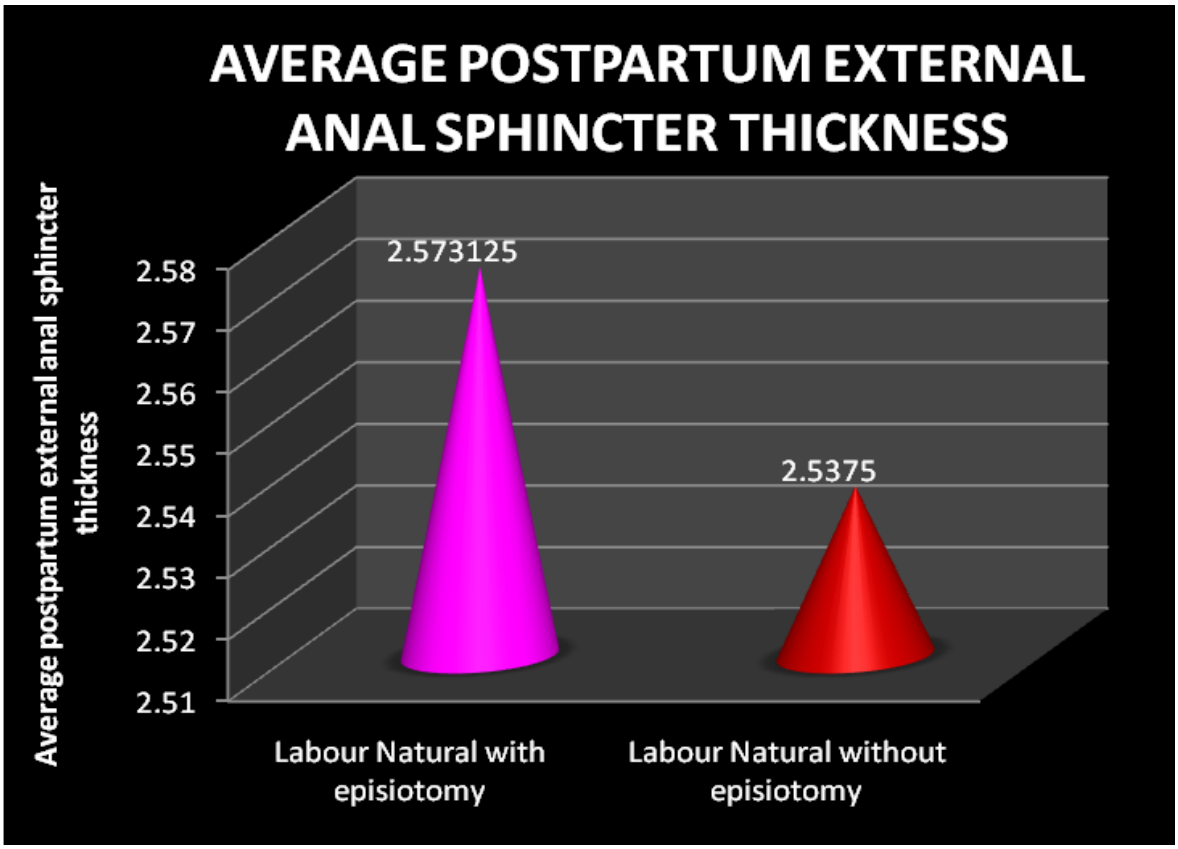
	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Women with intact sphincter	58	60
Women without intact sphincter	2	0
Total Number of Women	**60**	**60**

In the group of women who had Labour Natural with Episiotomy 58 women had an intact sphincter after delivery.

Two women had sphincter disruption immediately after delivery

In the group of women who had labour Natural without episiotomy all of them had an intact sphincter after delivery.

On a Pearson Chi Square test (p= 0.154) there was no significant difference between the two groups for sphincter integrity.



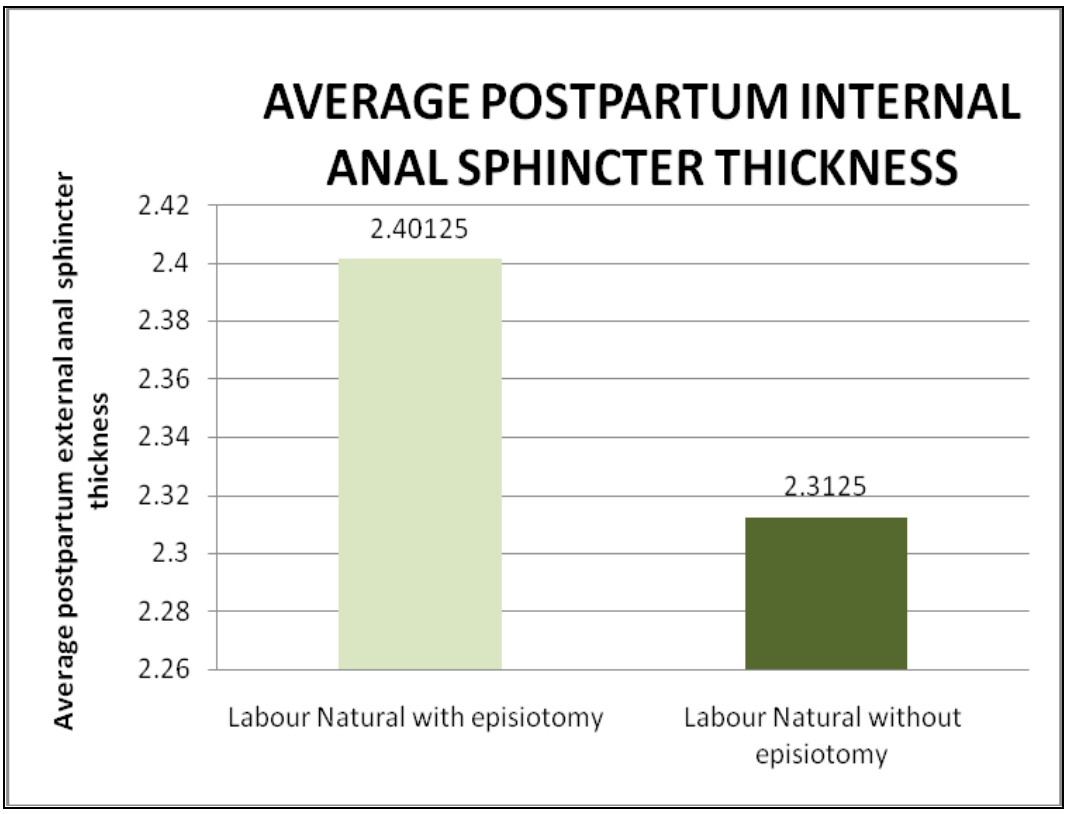
AVERAGE POSTPARTUM EXTERNAL ANAL SPHINCTER THICKNESS IN MM

TABLE XX

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Average Postpartum External Anal Sphincter Thickness In mm	2.573125	2.5375

p = 0.718401

There is no significant difference in the mean of the average post partum, external anal sphincter thickness between the two groups



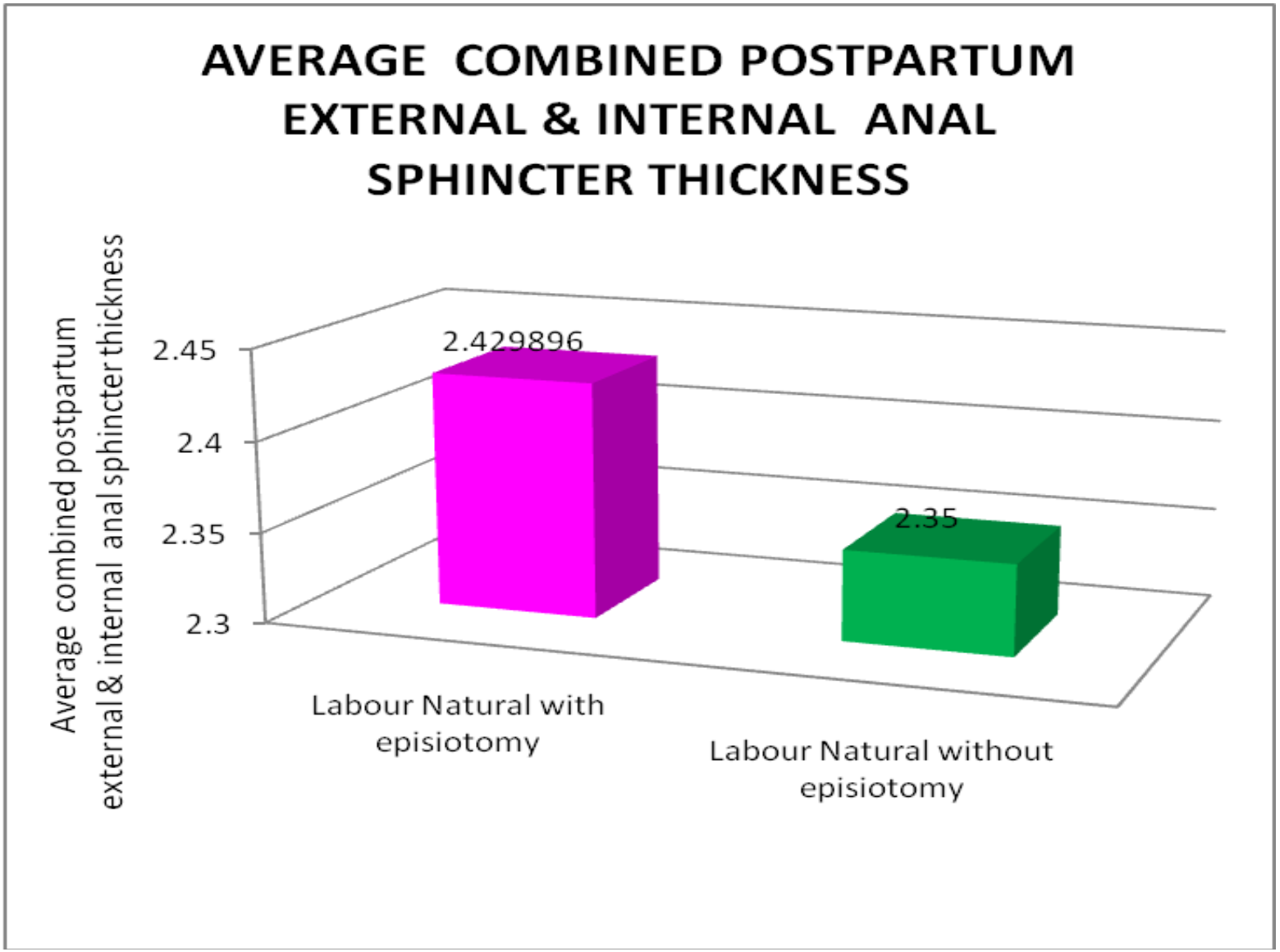
AVERAGE POSTPARTUM INTERNAL ANAL SPHINCTER THICKNESS IN MM

TABLE XXI

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Average Postpartum internal Anal Sphincter Thickness In mm	2.40125	2.3125

p = 0.166172

There is no significant difference in the mean of the average internal anal sphincter thickness between the two groups.


AVERAGE COMBINED POSTPARTUM EXTERNAL & INTERNAL ANAL SPHINCTER THICKNESS
Average combined postpartum external & internal anal sphincter thickness
2.45
2.4
2.35
2.3
2.429896
2.35
Labour Natural with episiotomy
Labour Natural without episiotomy

AVERAGE COMBINED POSTPARTUM EXTERNA L AND INTERNAL ANAL SPHINCTER THICKNESS

TABLE XXII

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Average Combined Postpartum External & Internal anal Sphincter Thickness	2.429896	2.35

p = 0.197768

There is no significant difference in the mean of the average combined post partum external and internal anal sphincter thickness between the two groups

AVERAGE EAS BEFORE AND AFTER DELIVERY IN MM

TABLE XXIII

	Average EAS Before Delivery	Average EAS after Delivery	P. Value
Labour Natural with Episiotomy	2.577083	2.525	0.000001
Labour Natural without Episiotomy	2.665833	2.568333	0.039653

Both the groups showed a significant difference in the average external anal sphincter thickness when compared before and after delivery with a decrease after delivery.

AVERAGE IAS BEFORE AND AFTER DELIVERY IN MM

TABLE XXIV

	Average IAS Before Delivery	Average IAS after Delivery	P. Value
Labour Natural with Episiotomy	2.32875	2.28	0.001031
Labour Natural without Episiotomy	2.398417	2.370417	0.009458

Both the groups showed a significant difference in the average internal anal sphincter thickness when compared before and after delivery with a decrease after delivery.

AVERAGE COMBINED EAS & IAS BEFORE AND AFTER DELIVERY IN MM

TABLE XXV

	Average EAS & IAS Before Delivery	Average EAS & IAS after Delivery	P. Value
Labour Natural with Episiotomy	2.452971	2.4025	0.000001
Labour Natural without Episiotomy	2.532125	2.469375	0.009005

Both the groups showed a significant difference in the average combined External and Internal anal sphincter thickness when compared before and after delivery with a decrease after delivery.

AVERAGE EAS AFTER DELIVERY AND POSTPARTUM IN MM

TABLE XXVI

	Average EAS After Delivery	Average EAS Postpartum	P. Value
Labour Natural with Episiotomy	2.59	2.573125	0.956862
Labour Natural without Episiotomy	2.538125	2.5375	0.945631

Both the groups did not show a significant difference in the average External anal sphincter thickness when compared after delivery and Postpartum.

AVERAGE IAS AFTER DELIVERY AND POSTPARTUM IN MM

TABLE XXVII

	Average IAS After Delivery	Average IAS Postpartum	P. Value
Labour Natural with Episiotomy	2.423125	2.40125	0.222267
Labour Natural without Episiotomy	2.34125	2.3125	0.009021

The first group did not show a significant difference in the average Internal anal sphincter thickness when compared after delivery and Postpartum.

The Second group showed a significant difference in the average Internal anal sphincter thickness when compared after delivery and Postpartum.

AVERAGE COMBINED EAS & IAS AFTER DELIVERY AND POSTPARTUM IN MM

TABLE XXVIII

	Average EAS & IAS After Delivery	Average EAS & IAS Postpartum	P. Value
Labour Natural with Episiotomy	2.450938	2.429896	0.187099
Labour Natural without Episiotomy	2.374063	2.35	0.010330

The first group did not show a significant difference in the average combined External and Internal anal sphincter thickness when compared after delivery and postpartum.

The Second group showed a significant difference in the average combined External and Internal anal sphincter thickness when compared after delivery and postpartum.

SUMMARY OF THE COMBINED SPHINCTER THICKNESS LEVELS

TABLE XXIX

	Labour Natural with Episiotomy	Labour Natural without Episiotomy
Before Delivery and After Delivery	Significant	Significant
After Delivery and Postpartum	Not Significant	Significant

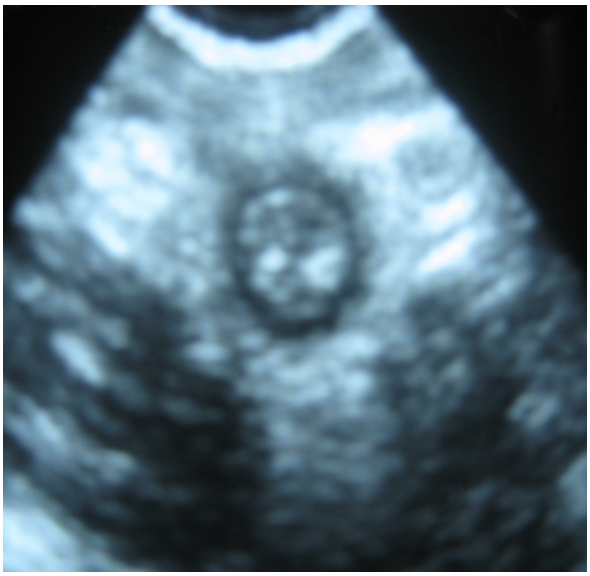
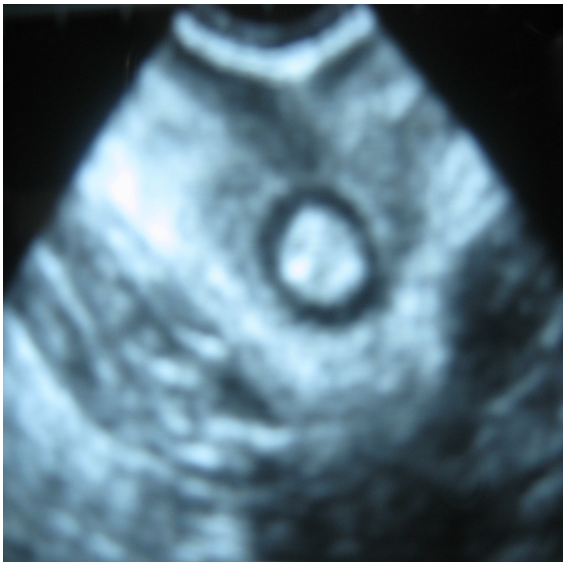


Image of a normal anal sphincter as visualized by TVS



Normal anal sphincter with thick internal anal sphincter

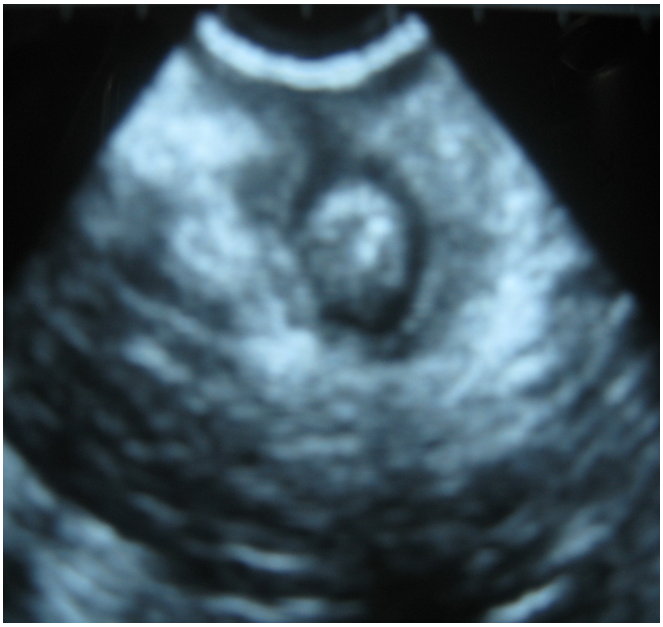


Image of a sphincter tear at 11 0’clock

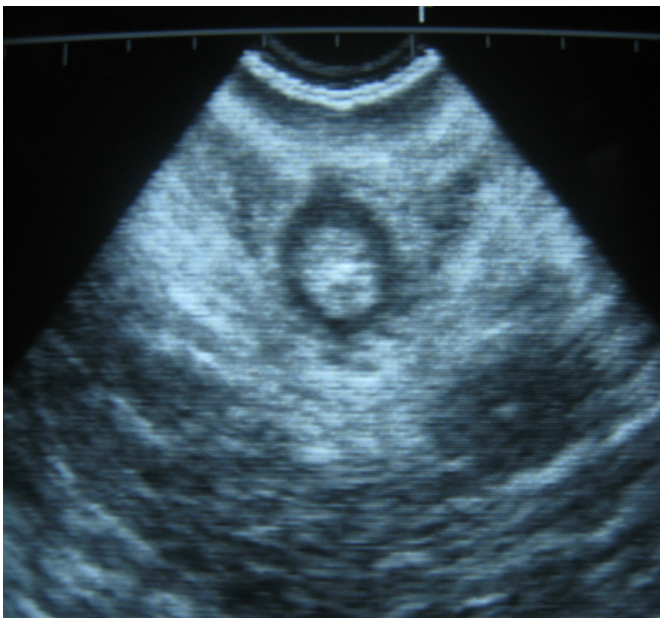


Image of a sphincter tear between 11 and 12 0’ clock

SUMMARY

SUMMARY

1. Of the total number of women who delivered in this hospital 49.78% were primiparous.

2. Among the primiparous women 46.445% underwent a primary cesarean section.

3. Of the 53.555% of primiparous women who delivered vaginally 87.97% had an episiotomy during delivery.

4. Most of the women in both the groups belonged to the age group 20 -25 years.

5. There is no significant difference between the two groups with respect to age ($p = 0.198$) and hence the two groups are comparable.

6. Most of the babies born to women in both groups weighed between 2.5 to 3 kg.

7. There is no significant difference between the means of the birth weights of babies born to women in both the groups. ($p = 0.095$).

8. The mean APGAR at one minute and at five minutes are not significantly different between the two groups.

9. There is no significant difference in the mean of the duration of second stage of labour in minutes between the two groups.

10. The most common symptom of incontinence before delivery was passing flatus when undesirable.

11. None of the women in both the groups had any signs of anal incontinence before delivery.

Before Delivery

12. There is no significant difference in the mean of the average external anal sphincter thickness before delivery between the two groups. (P=0.676).

13. There is no significant difference in the mean of the average internal anal sphincter thickness before delivery between the two groups. p = 0.2.

14. There is no significant difference in the mean of the average combined external and internal anal sphincter thickness before delivery between the two groups. p=0.384.

15. None of the women in the two groups developed any new symptoms after delivery.

After Delivery

16. There is no significant difference in the mean of the average external anal sphincter thickness after delivery between the two groups p=0.581.

17. There is no significant difference in the mean of the average internal anal sphincter thickness after delivery between the two groups. p=0.113.

18. There is no significant difference in the mean of the average combined external and internal anal sphincter thickness after delivery between the two groups. p=0.252.

19. Two women had sphincter disruption immediately after delivery in the group of women who had Labour Natural with Episiotomy. On

comparison with the group that did not have an episiotomy this was not statistically significant.

Post partum

20. There is no significant difference in the mean of the average post partum, external anal sphincter thickness between the two groups p=0.718401.

21. There is no significant difference in the mean of the average internal anal sphincter thickness between the two groups p=0.166172.

22. There is no significant difference in the mean of the average combined post partum external and internal anal sphincter thickness between the two groups p=0.197768.

23. The Average EAS and IAS and their combined thickness showed a significant difference in both the groups when compared before and after delivery with a decrease in thickness after delivery.

24. When compared after delivery and postpartum the EAS did not show a significant difference in both the groups.

In the women who had an episiotomy there was no significant difference in the IAS thickness after delivery and postpartum.

In the women who did not have an episiotomy there was a significant difference in the IAS thickness after delivery and postpartum.

25. In the women who had an episiotomy there was no significant difference in the combined thickness after delivery and postpartum.

In the women who did not have an episiotomy there was a significant difference in the combined thickness after delivery and postpartum.

DISCUSSION

DISCUSSION

Thacker and Banta estimated that episiotomy was performed on 50% to 90% of all nulliparas (6)

Thorpe et al reported that episiotomy was performed on 62% of vaginal deliveries and further breakdown revealed that this procedure was performed in 80% of nulliparas.(9)

In this study the episiotomy rate among primiparous women is 87.97%.

Larrson et al compared an episiotomy group with a lacerated group and a non traumatic birth group and found no significant differences in APGAR scores among the two groups. (49)

Thranov et al studied one minute APGAR scores and found no differences among groups with low, medium and high episiotomy rates. (48)

Borgatta et al have also found no difference in APGAR scores between episiotomy and no episiotomy groups. (50)

In this study there was no significant difference in the APGAR scores between the two groups.

Borgatta et al and Harrison et al have found no significant difference in the duration of second stage of labour between the episiotomy group and no episiotomy group.

In this study there was no significant difference in the duration of second stage of labour in minutes between the two groups.

There is no difference in the individual and combined averages of the sphincter thickness before delivery, after delivery and postpartum between the two groups in this study.

The is a significant decrease in the individual and combined sphincter thickness immediately after delivery when compared to before delivery irrespective of whether an episiotomy was given or not.

The is a significant decrease in the internal and combined anal sphincter thickness in postpartum period when compared to immediately after delivery in the labour natural without episiotomy group

CONCLUSION

CONCLUSION

Episiotomy is the most commonly performed surgical procedure in Obstetrics. There will always be circumstances in which prudent clinical judgement may dictate the necessity for an episiotomy: fetal distress, shoulder dystocia, breech delivery, persistent occipito posterior vacuum or forceps operation and maternal exhaustion.

Until clear guidelines emerge for practitioners based on prospective randomized control trials, obstetricians should determine the need for episiotomy on a **case by case** basis.

The use of transvaginal ultrasound is a simple method to evaluate the anal sphincter that can be used in centres where more advanced methods like endoanal ultrasound, pudendal nerve terminal motor latency and anal manometry are not readily available.

Increasing awareness of the frequency and extent of pelvic floor lesions has led to the increased use of new diagnostic and treatment modalities. Our understanding of normal pelvic floor anatomy and its ultrasonographic appearance has improved as imaging options have expanded The next step is practical application of these findings to characterizing pelvic floor function. This can be done through well-designed and sufficiently powered clinical studies. These studies will establish the association between the clinical presentations of dysfunction and the ultrasonographic findings.

Annexure

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BIBLIOGRAPHY

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PROFORMA

PROFORMA FOR EVALUATION

Name : Age: I.P. No:

Date of Admission: Date of Delivery:

Obstetric score:

Symptoms:

Passage of any flatus when socially undesirable

Any incontinence of liquid stool

Any need to wear a pad because of anal symptoms

Any incontinence of solid stool

Any fecal urgency (inability to defer defecation for more than 5 minutes)

Past medical history:

History of diabetes, preexisting neurological dysfunction

Past Surgical history:

History of back injury

History of surgical treatment of back pain

History of abdominopelvic surgery like hemorroidectomy

History of radiation

Present Obstetric history:

Birth Weight of Baby;

Duration of second stage of labour: APGAR 1; APGAR 5

Mode of delivery

With or without episiotomy

Episiotomy: median / mediolateral

Perineal laceration: degree of perineal laceration.

Without perineal laceration

General Examination:

Spine:

Evidence of neurological deficit

Before delivery:

P/A:

Local examination:

Posterior vaginal wall:

P/R to rule out mass, impaction

Perineal body:

Levator anii tone

External sphincter tone on voluntary contraction

Signs:

perianal soiling,

absence of the cutaneous anal reflex

patulous anus

local scarring

Ultrasonographic criteria:

Before delivery Sphincter thickness:

EAS – External Anal Sphincter IAS – Internal Anal Sphincter

EAS 12 o' clock:	IAS 12 o' clock:
EAS 3 o' clock:	IAS 3 o' clock:
EAS 6 o' clock:	IAS 6 o' clock:
EAS 9 o' clock:	IAS 9 o' clock:
Average EAS:	Average IAS:

After delivery:

Any new symptoms of incontinence:

Local examination:

Posterior vaginal wall:

Perineal body:

Levator anii tone

External sphincter tone on voluntary contraction

Signs:

perianal soiling,

absence of the cutaneous anal reflex

patulous anus

local scarring

After delivery Sphincter thickness:

EAS 12 o' clock: IAS 12 o' clock:

EAS 3 o' clock: IAS 3 o' clock:

EAS 6 o' clock: IAS 6 o' clock:

EAS 9 o' clock: IAS 9 o' clock:

Average EAS: Average IAS:

Postpartum

Any new symptoms of incontinence:

Local examination:

Posterior vaginal wall:

Perineal body:

Levator anii tone

External sphincter tone on voluntary contraction

Signs:

perianal soiling,

absence of the cutaneous anal reflex

patulous anus

local scarring

Postpartum Sphincter thickness:

EAS 12 o' clock:	IAS 12 o' clock:
EAS 3 o' clock:	IAS 3 o' clock:
EAS 6 o' clock:	IAS 6 o' clock:
EAS 9 o' clock:	IAS 9 o' clock:
Average EAS:	Average IAS:

Abbreviations

s

ABBREVIATIONS

ES, EAS – External Anal Sphincter.

IS, IAS – Internal Anal Sphincter.

PP – Postpartum.

Master chart

BEFORE 12 EAS – External Anal Sphincter thickness at 12 o'clock position

before delivery.

BEFORE 12 IAS - Internal Anal Sphincter thickness at 12 o'clock position before
delivery.

AVG EAS – Average External Anal Sphincter thickness before delivery.

AVG IAS - – Average Internal Anal Sphincter thickness before delivery.

AFTER 12 EAS - External Anal Sphincter thickness at 12 o'clock position after
delivery.

AFTER 12 IAS- Internal Anal Sphincter thickness at 12 o'clock position after
delivery.

AVG AFTER EAS - Average External Anal Sphincter thickness after delivery.

AVG AFTER IAS - Average External Anal Sphincter thickness after delivery.

PP 12 EAS - External Anal Sphincter thickness at 12 o'clock position postpartum.

PP 12 IAS- Internal Anal Sphincter thickness at 12 o'clock position postpartum.

AVG PP EAS - Average Internal Anal Sphincter thickness postpartum.

MASTERCHART